Structural Characteristics of Scale Which are Used in the Investigation of the Mechanism of Diffusion with Reaction

under otherwise equal conditions, an intensified role of the given component in the overall diffusion process; but in their discussion of this effect the authors show that this is not unambiguous since recrystallization texture can also arise, and point to other possible complications. They emphasise that all structural characteristics in all scale layers should be examined. Grain-size distribution also gives valuable indications (e.g. the presence in the scale layer of a finer-grain zone at the scale/solid boundary suggests diffusion of a component from the opposite scale boundary) but here, too complicating factors exist. Further evidence can sometimes be obtained from changes in the form of external scale surface, especially when one component is liquid or gaseous and the solid specimen is initially a rectangular parallelipiped: one-way diffusion of one component is detectable but with two-way diffusion of both the visible effects may disappear. Pfeil's (Ref 11) inert-marker method is useful if the relative size of markers is sufficiently small but their fixing is

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Structural Characteristics of Scale Which are Used in the Investigation of the Mechanism of Diffusion with Reaction

difficult. Although each of the methods discussed gives only qualitative indications, the authors show that their suitable combination enables primary and secondary effects to be distinguished. They give a tabulation of these (Table 1) and note that further indications can be obtained from the concentration gradient, whose determination is, however, often difficult. Table 2 gives a scheme for grading observed effects to obtain the most reliable estimate of the role of each component in the process. There are 2 tables and 12 references, 9 of which are Soviet, 2 English and 1 German.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: December 26, 1959

VB

Card 3/3

Blankova, Ye. B

S/126/60/010/01/007/019
E111/E335

AUTHORS: Arkharov, V.I. and Blankova, Ye.B.

TITLE: The Degree of Participation of Components in Diffusion with Reaction in High-temperature Oxidation of Certain Transition Metals

PERIODICAL: Fizika metallov it metallovedeniye, 1960, Vol.10, No. 1, pp 63 - 69

TEXT: The authors have previously studied diffusion in a number of binary systems in which one component is a fourth or fifth-group transition metal and the other is either sulphur, selenium or tellurium (Refs.1-3). To obtain a fuller and more correct background on the mechanism of the high-temperature oxidation of metals the authors now relate, using mainly published but some original data, these results to those on similar systems in which oxygen participates in place of sulphur, etc. To evaluate the degree of participation of components in diffusion they use their previously described system (Ref.4). Published data for titanium (Refs.5-10) show that on their system (Ref.4) the mechanism differs depending on whether the temperature is above or below 900 °C. at higher temperatures

Card1/4

The Degree of Participation of Components in Diffusion with Reaction in High-temperature Oxidation of Certain Transition Metals

the role of metal diffusion increases. Vanadium (Ref.11) has a first stage of scaling (400 - 600 °C in air) in which oxygen diffusion and reaction occurs in the metal/scale interface; later metal diffuses. Previous conclusions (Ref. 12) on diffusion in chromium oxidation require revision in the light of later work (Ref. 13); there are indications, however, of oxygen diffusion, although data are insufficient for firm conclusions. With manganese diffusion is in both directions (Ref. 16). The authors describe additional experiments with inert markers (Figure 1) which suggest that manganese diffusion plays the greater part. With iron, oxygen diffusion predominates below 400 °C; at higher temperatures both elements diffuse and the scale has a complex character (Refs.18-20). The authors report additional experiments with cobalt (Fig. 2 shows appearance of a specimen with platinum wire on its surface, oxidised in air for 8 hours at 1000 °C): these confirm previous indications (Refs 20, 21) that intensive diffusion of oxygen

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The Degree of Participation of Components in Diffusion with Reaction in High-temperature Oxidation of Certain Transition Metals

occurs. Dealing with nickel the authors discuss divergent published results (Refs.20-24) and suggest an explanation which is contrary to calculations based on Wagner's theory. Oxidation of zirconium, niobium and molybdenum and tungsten occurs by diffusion of oxygen. Finally, the authors deal with two non-transition metals, copper and zinc. For the former additional experiments (Fig. 3 shows an inert marker in a fully oxidized specimen) supported the view (Refs.27-29) that copper-ion diffusion is mainly responsible and not two-directional diffusion (as suggested in Refs. 30 and 31). Zinc is oxidised with diffusion of the metal (Ref. 32). For both copper and zinc the mechanisms are in good agreement with Wagner's theory. The authors assign the type of diffusion for each of the transition metals to the classification proposed previously (Ref. 4).

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S/126/60/010/01/007/019
E111/E335

The Degree of Participation of Components in Diffusion with Reaction in High-temperature Oxidation of Certain Transitions Metals

There are 3 figures and 32 references: 15 Soviet, 13 English, 2 German. 1 Czech and 1 Scandinavian.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University im. A.M. Gor'kiy)

SUBMITTED: March 21, 1960

Card 4/4

Blankova, Ye.B.

82638
S/126/60/010/02/008/020
18.7530 E111/E352

AUTHORS: Arkharov, V.I. and Blankova, Ye.B.

TITLE: Investigation of Diffusion with Reaction in Binary Systems of the Type "Metal-Gas". IV.

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol. 10, No. 2, pp. 226 - 232

TEXT: The authors continue their series of investigations (Refs. 1, 2) aimed at elucidating the factors determining diffusion mechanism in metal-gas systems. They review their previous conclusions and analyse further experimental data. They conclude from this and general theoretical considerations that the main crystallographic factor is the nature of the bonding forces between the components in the reaction-product crystal lattice. In systems "transition metal-metalloid (or gas)" an increase in the relative importance of homopolar bonds in compounds can be related to increase in the relative role of diffusion of the metalloid in the overall reaction diffusion process. They suggest that an elementary diffusion function is possible in which, because of existence of homopolar bonds, a local redistribution of electron density occurs with formation

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Investigation of Diffusion with Reaction in Binary Systems of the Type "Metal-Gas". IV.

of an atomic complex including a metalloid ion located in the vacancy of the metal sub-lattice, and its closest surrounding ions of metal with locally charged valency. This provides an explanation for the experimentally observed change in the relative role of diffusion of the components when the composition of binary diffusion systems is varied, particularly in those cases which are not explicable on purely crystallogeometrical considerations. On the basis of these ideas the authors examine and explain reaction-diffusion mechanism in a number of binary systems, including titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, zirconium, niobium, molybdenum and tungsten with oxygen, sulphur, selenium or tellurium; also in Fe-P, Co-P and Ni-P. There are 1 table and 16 references: 10 Soviet, 3 English, 2 German and 1 international.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo (Ural State University im. A.M. Gor'kiy)

SUBMITTED: March 21, 1960

Card 2/2

ARKHAROV, V.I.; BLANKOVA, Ye.B.; KONEV, V.N.; KHUSHATINA, N.A.

Formation mechanism of two-layer, single-phase scale in the sulfidizing of metals. Fiz.met. i metalloved. 18 no.5:730 N '64. (MIRA 18:4)

1. Ural'skiy gosudarstvennyy universitet im. A.M.Gor'kogo.

BLANKOVSKAYA, T.F. [Blankovs'ka, T.P.]

Cytoembryological study of wheat in interspecific crossing.
Ukr. bot. zhur. 22 no.2:36-39 '65. (MIRA 18:4)

1. Odesskiy gosudarstvennyy universitet im. Mechnikova, kafedra genetiki i darvinizma.

BLAGOVSKAYA, T.F.

Embryogeny of durum wheat grown from normal and u[illegible] seeds. Nauch. dokl. vys. shk. biol. nauki no.1:[illegible] '66. (MIRA 19:2)

1. Rekomendovana kafedroy genetiki i darvinizma Odesskogo gosudarstvennogo universiteta im. I.I.Mechnikova. Submitted October 15, 1964.

BLANKOVSKAYA, T.P. [Blankovs'ka, T.P.], student biolog. fakul'teta; KOTS, Z.P., nauchnyy rukovoditel', starshiy prepodavatel'

Effect on yield of supplementary pollination of corn with pollen from another variety. Pratsi Od.un. Zbir.stud.rob. 149 no.5:193-196 '59. (MIRA 13:4)

1. Odesskiy gosudarstvennyy universitet.
(Corn(Maize))

BLANKSHTEYN, A.I.

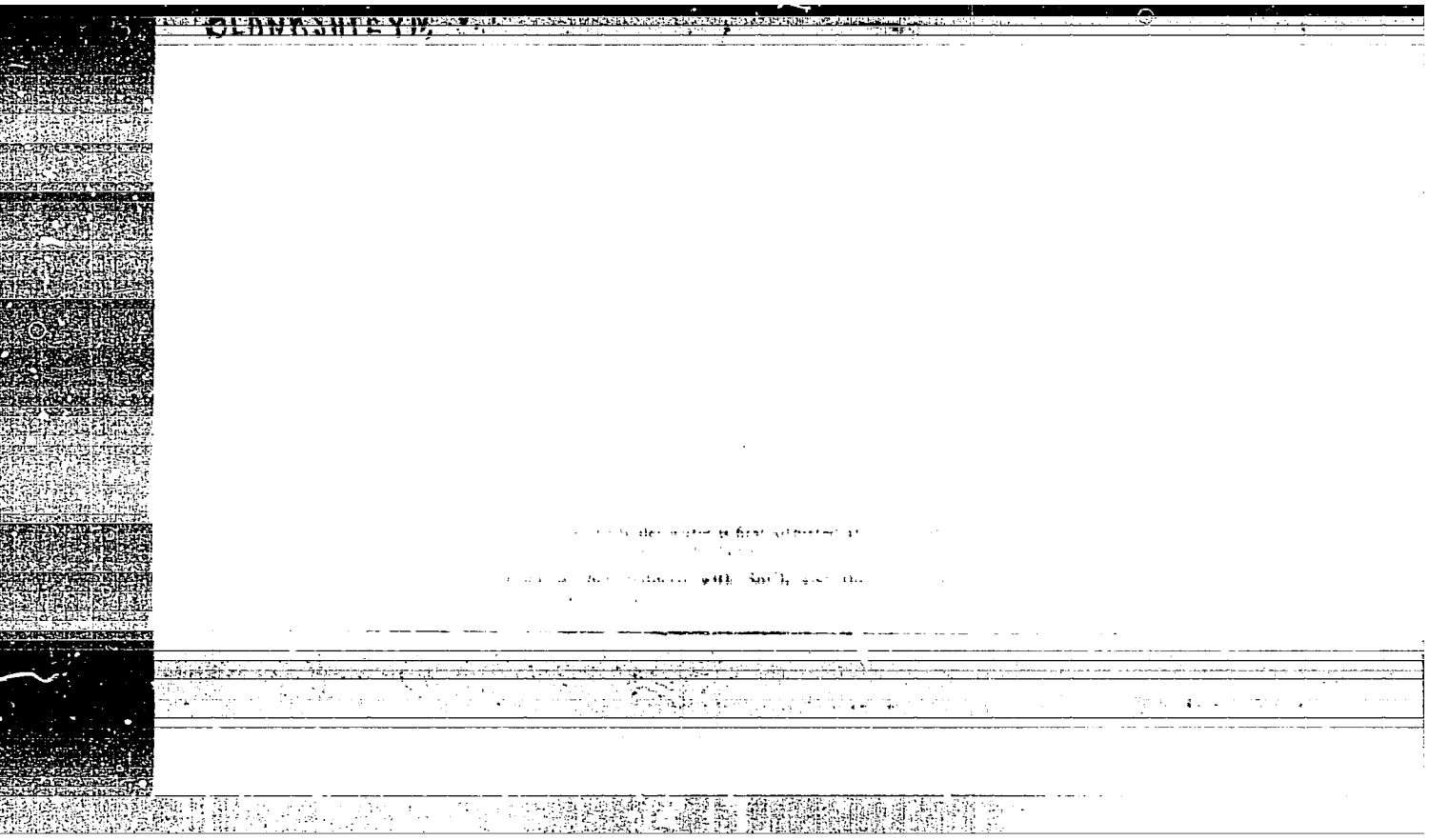
Drug Trade-Costs

Production costs should be lowered in every way possible
Med. prom. no. 2, 1952

BLANKSHTEYN, A. I.

7703. AKASENKO, F. I. I. BLANKSHEYN, A. I. - Printsip Material'noy zainteresovannosti v. Kolkhoznom proizvodstve. L. Lenizdat, 1954. 115s. 20 sm. 10.000 ekz. 1 R. 80 K. -(55-4195)p
338.1 Kt 338. 1K (47.41)

SO: Knizhnaya Letopis', Vol. 7, 1955



BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; VORONOV A.A., prof., red.; AGEYKIN, D.I., doktor tekhn.nauk red.; GAVRILOV, M.A., red.; VENIKOV, V.A., doktor tekhn. nauk, prof., red.; SOTSKOV, B.S., red.; CHELYUSTKIN, A.B., doktor tekhn. nauk, red.; PROKOF'YEV, V.N., doktor tekhn. nauk, prof., red.; IL'IN, V.A., doktor tekhn. nauk, prof., red.; KITOV, A.I., doktor tekhn. nauk, red.; KRINITSKIY, N.A., kand. fiz.-mat. nauk, red.; KOGAN, B.Ya., doktor tekhn. nauk, red.; USHAKOV, V.B., doktor tekhn. nauk, red.; LERNER, A.Ya., doktor tekhn. nauk, prof., red.; FEL'DBAUM, A.A., doktor tekhn. nauk, prof., red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, red.; KHARKEVICH, A.A., akademik, red. [deceased]; TIMOFEYEV, P.V., red.; MASLOV, A.A., dots., red.; TRUTKO, A.F., inzh., red.; LEVIN, G.A., prof., red.; LOZINSKIY, M.G., doktor tekhn. nauk, red.; NETUSHIL, A.V., doktor tekhn. nauk, prof., red.; POPKOV, V.I., red.; ROZENBERG, L.D., doktor tekhn. nauk, prof., red.; LIFSHITS, A.L., kand. tekhn. nauk, red.; AVEN, O.I., kand. tekhn. nauk, red.; BLANN, O.M. [Blunn, O.M.], red.; BROYDA, V., inzh., prof., red.; BREKKL', L. [Brockl, L.] inzh., knad. nauk, red.; VAYKHARDT, Kh. [Weichardt, H.], inzh., red.; BOCHAROVA, M.D., kand. tekhn. nauk, st. nauchn. red.

[Automation of production processes and industrial electronics] Avtomatizatsiia proizvodstva i promyshlennaia elektronika; entsiklopediia sovremennoi tekhniki. Moskva, Sovetskaia entsiklopediia. Vol.4. 1965. 543 p. (MIRA 18:6)

BLANSHEY, F.B., inzhener.

Analysis and calculation of the consumption of sugar ·n-taining materials for the reduction of chrome liquor. Leg. prom. 16 no.7:33-34 Jl '56. (MLRA 9:10)

(Tanning materials) (Reducing agents)

BLANSHEY, F.B., inzh.

Consumption of molasses for sole leather filling. Leg.prom. 17 no.8:17-18 Ag '57. (MIRA 10:10)
(Leather industry--Equipment and supplies)

BLAGHEY, F.B., insh.

Fillers composed of hydrolysate sugars and magnesium carbonate.
Kozh.-obuv.prom.no.2:20-21 F '59. (MIRA 12:6)
(Leather)

BLANSHEY, F.B., inzh.

Effect of the drying conditions and re-solution on the physical and chemical properties of chrome extracts. Kozh.-obuv.prom. 4 no.8:17-18 Ag '62. (MIRA 15:8)
(Tanning materials)

CZECHOSLOVAKIA/Virology. Human and Animal Viruses. Grippe Virus E

Abs Jour : Ref Zhur - Biol., No 4, 1959, No 14644

Author : Drevo M., Spousta A., Blansko B., Slonim D.
Inst : -
Title : The Preparation of a Specific Horse Serum Against the Grippe.

Orig Pub : Ceskosl. epidemiol., mikrobiol., immunol., 1958, 7, No 3, 175-181.

Abstract : No abstract.

Card 1/1

LAVROVSKAYA, V.M.; BLANT, M.Ye.

Study of the cholera antigen. Report No.4: Effect of the initial culture of Vibrio cholerae on the quantity and specific activity of antigen complexes. Zhur. mikrobiol., epid. i immun. 41 no.1:108-112 Ja '64. (MIRA 18:2)

1. Gor'kovskiy institut epidemiologii i mikrobiologii.

BLANTER, B.

"Turner" sounds like a distinguished profession. Znan.sila 35 no.9: 8-10 S '60. (MIRA 13:10)

(Technical education)
(Turning--Technological innovations)

BLANTER, M., inzh.

New self-discharging trailer for pipe transportation.
Avt.transp. 40 no.3:41-42 Mr '62. (MIRA 15:2)
(Truck trailers)

BLANTER, M., insh.

Five times smaller, twenty-five times more powerful. IUn.tekh. 7 no.3:42-43 Mr '63. (MIRA 16:3)
(Hydraulic motors)

BLANTER, inzh.

Stand for cleaning motor-vehicle wheel rims. Avt.transp. 41 no.1:53 Ja '63. (MIRA 16:2)
(Motor vehicles—Maintenance and repair)

BLANTER, M.S., inzhener

Improving the economy of a steam turbine at electric power stations of coal industry enterprises. Ugol' 30 no.4:30-31 Ap '55. (MLRA 8:6)

1. Remontno-naladochnoye upravleniye tresta Osobproyektmontazh. (Coal mines and mining) (Steam turbines)

BLANTER, Mikhail Samuilovich; KIRSANOV, I.N., red.; LARIONOV, G.Ye., tekhn.red.

[To help the technician in steam turbine tests] V pomoshch' nabliudateliu pri ispytanii parovykh turbin. Moskva, Gos. energ.izd-vo, 1959. 55 p. (MIRA 13:6)
(Steam turbines--Testing)

BLANTER, Mikhail Samuilovich; CHECHKO, V.M., red.; DONSKAYA, G.D., tekhn.red.

[Operating the ZIL-164 N tractors with semitrailers; experience of the best drivers of the Transportation Department of the Moscow Building Trust] Ekspluatatsiia tiagachei ZIL-164N s polupritsepami; iz opyta raboty peredovykh shoferov Mosstroitransa. Moskva, Nauchno-tekhn.izd-vo M-va avtomobil'nogo transporta i shosseinykh dorog RSFSR, 1960. 39 p. (MIRA 13:11)
(Moscow--Motortrucks)

BLANTER, M.S.; FINKEL'SHTEYN, B.N.; SHIL'SHTEYN, S.Sh.

Thermodynamics of binary alloys. Izv.vys.ucheb.zav.; chern. met. no.3:10-12 '60. (MIRA 13:4)

1. Moskovskiy institut stali.
(Alloys--Thermal properties)

S/590/62/105/000/009/015
I031/I242

AUTHORS: Mirkin, I.L., Dr. of Technical Sciences, Volkova, T.I., Candidate of Technical Sciences, and Blanter, M.S., Eng.

TITLE: Effect of vacuum melting on heat-resistant properties of iron alloys

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya. Trudy. v.105, 1962, 125-134

TEXT: The present work was carried out because of the absence of information on the influence of vacuum melting on relaxation and creep behavior in high-temperature alloys. Four grades of iron-base steels were investigated: pure iron; non-hardenable single phase Fe-Cr-Ni steel; slow aging alloy with Mo and W added, and an alloy highly susceptible to aging, with Mo, W, Ti, Al and Nb added. Melting was performed in an induction furnace at a pressure of 1.10^{-4} - 5.10^{-5} mm Hg. Short-term mechanical properties, stress-

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S/590/62/105/000/009/015
I031/I242

Effect of vacuum melting...

rupture strength , relaxation, and creep resistance were tested. As a result of vacuum melting relaxation and creep resistance increased with increasing complexity of the chemical and phase composition of steel. High-alloy steels gain stress-rupture strength and lose ductibility, while vacuum melting of low-alloys improves their ductility to some extent but does not influence a long-term strength behavior. Optimal heat-resistant properties may be gained by applying vacuum melting and pouring with alloys of more complex chemical and phase composition than that suggested for conventional melting. There are 5 figures and 5 tables.

Card 2/2

BLANTER, M. S.

Hydraulic hinge for a pipe truck. Avt. prom. 28 no.9:27 S '62.
(MIRA 15:10)

(Motortrucks)

DEKHTYAR, I.Ya.; MIRKIN, I.L.; MIKHALENKOV, V.S.; FEDCHENKO, R.G.; VOLKOVA, T.I.; BLANTER, M.S.

Investigating the paramagnetic properties of heat-resistant alloys on an iron and nickel base. Issl. po zharoproch. splav. 10:87-92 '63.
(MIRA 17:2)

BLANTER, M.S., inzh.

Inertia-type locomotive with gyrofly wheel. Shakht. stroi. 7 no.12:16-17 D'63. (MIRA 17:5)

BLANTER, M., konstruktor, izobretatel'

"Delicate" clutches of a giant. Izobr. i rats. no.7:8-9 '63. (MIRA 16:9)

1. Spetsial'noye konstruktorskoye byuro Moskovskoy gosudarstvennoy stroitel'noy kontory.

(Pipe--Transportation)

S/3659/63/010/000/0087/0092

AT4013932

AUTHOR: Dekhtyar, I. Ya.; Mirkin, I. L.; Mikhalenkov, V. S.; Fedchenko, R. G.; Sinova, T. I.; Blanter, M. S.

TITLE: Investigation of the paramagnetic properties of high temperature alloys on an iron-nickel base

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, 1963, 87-92

TOPIC TAGS: paramagnetic steel, high temperature alloy, iron alloy, nickel alloy, chromium alloy, alloy paramagnetic property, paramagnetism

ABSTRACT: The temperature dependence of the paramagnetic properties of high temperature alloys on an iron and nickel base was investigated as a guide to their electronic structure and the effective number of electrons N. It was found that the maximum number of electrons for nickel-chromium alloys is found in those containing 10% Cr. Addition of niobium to an alloy of Ni + 16% Cr leads to significant increase in N. Investigation of complex alloys on a nickel-chromium base showed that the maximum N is observed in alloys with aluminum and titanium. Investigation of complex alloys on an iron-nickel-chromium base showed

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ACCESSION NR: AT4013932

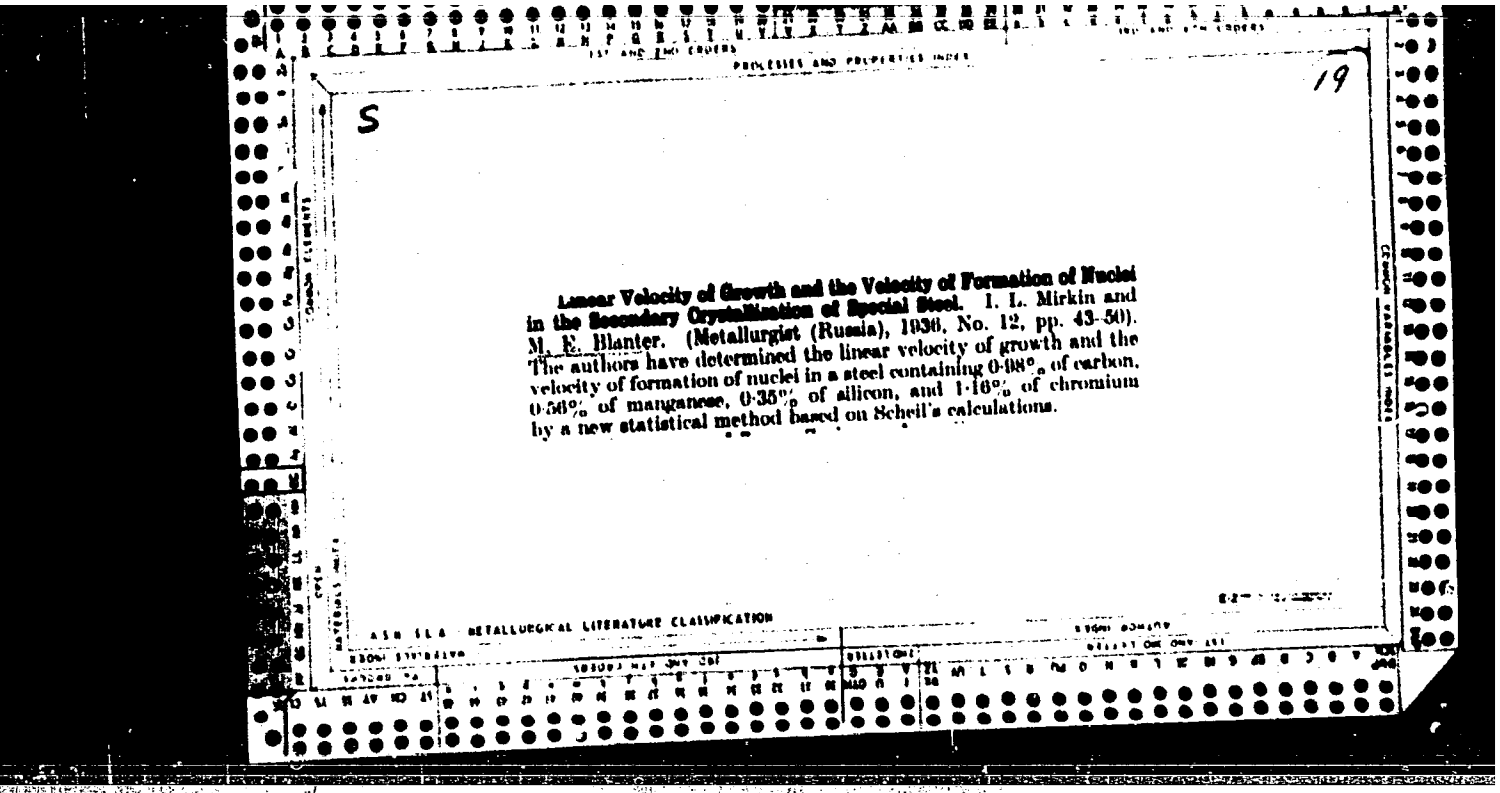
that the effective magnetic moment connected with N is maximal in alloys containing tungsten and molybdenum, while niobium, titanium and aluminum lead to a decrease in N. The results obtained and their comparison with tensile strength studies show that the number of electrons in the bond found on the basis of the temperature dependence of paramagnetic sensitivity may characterize the strength of the interatomic bonds at high temperatures. Orig. art. has: 3 figures, 2 tables and 9 formulas.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00 DATE ACQ: 27Feb64 ENCL: 00

SUB CODE: ML NO REF SOV: 002 OTHER: 000

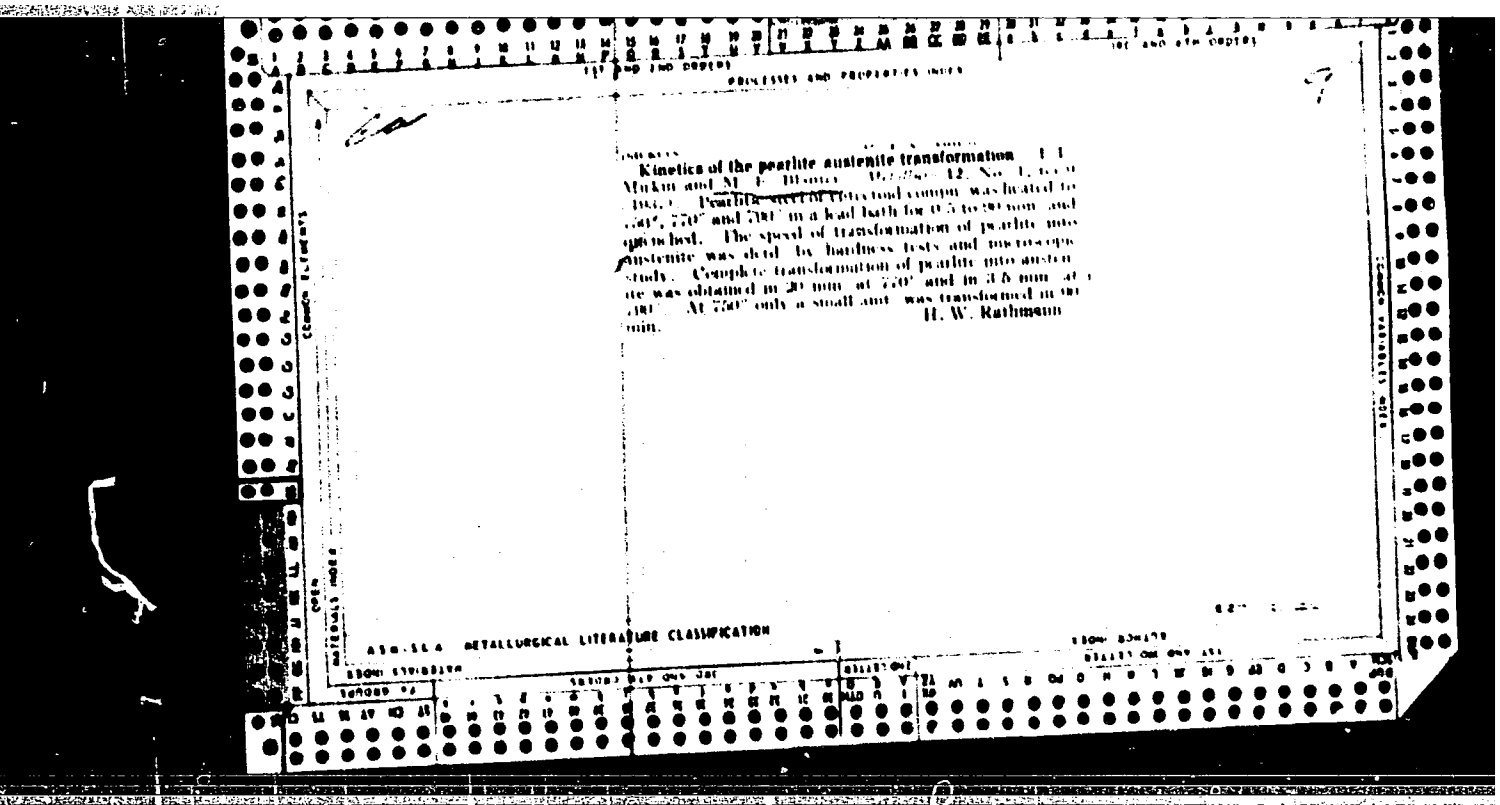
Card 2/2



S

19

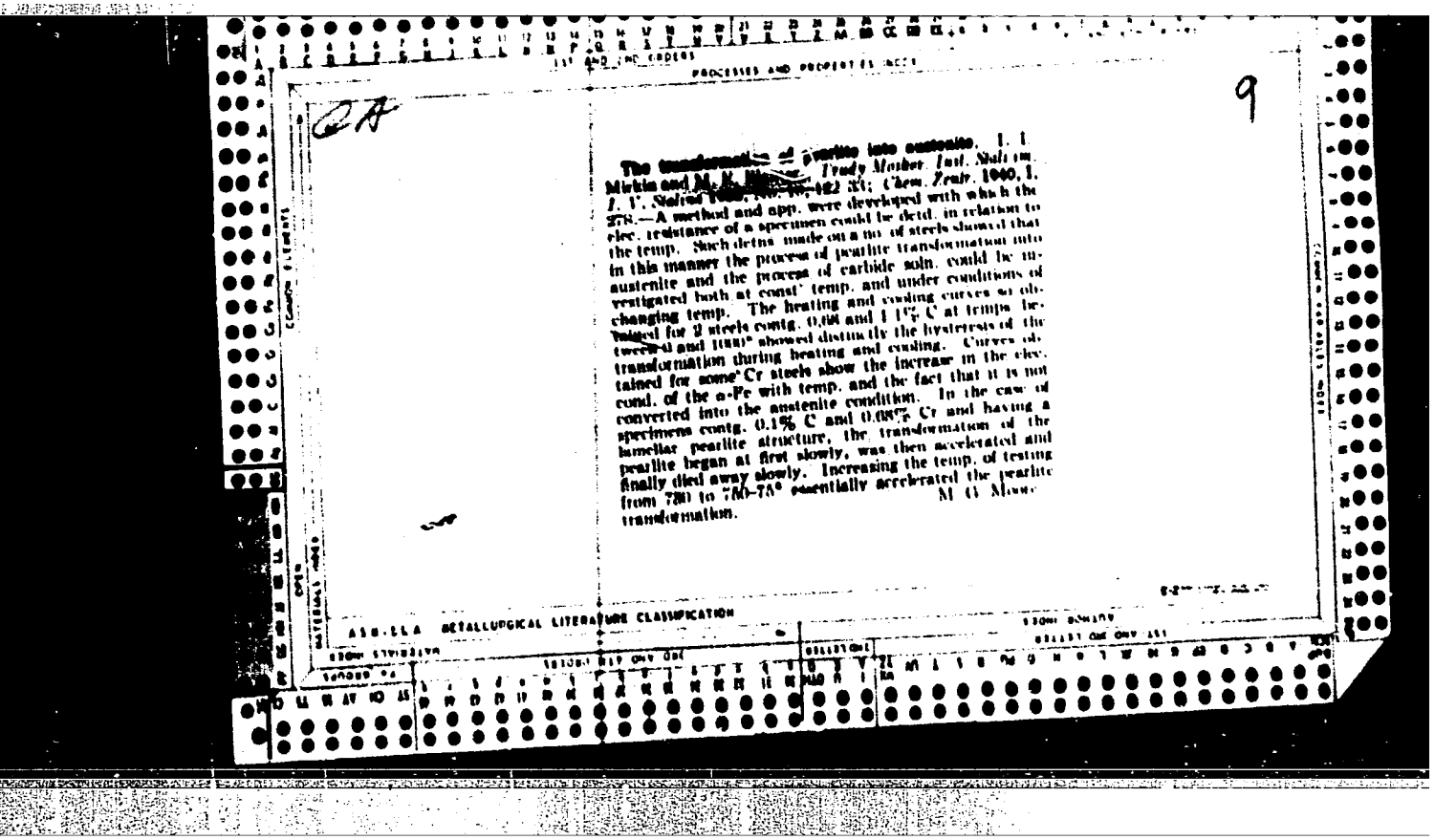
Linear Velocity of Growth and the Velocity of Formation of Nuclei in the Secondary Crystallization of Special Steel. I. L. Mirkin and M. E. Blanter. (Metallurgist (Russia), 1936, No. 12, pp. 43–50). The authors have determined the linear velocity of growth and the velocity of formation of nuclei in a steel containing 0·98% of carbon, 0·56% of manganese, 0·35% of silicon, and 1·16% of chromium by a new statistical method based on Scheil's calculations.



Kinetics of the pearlite austenite transformation

H. W. Rathmann

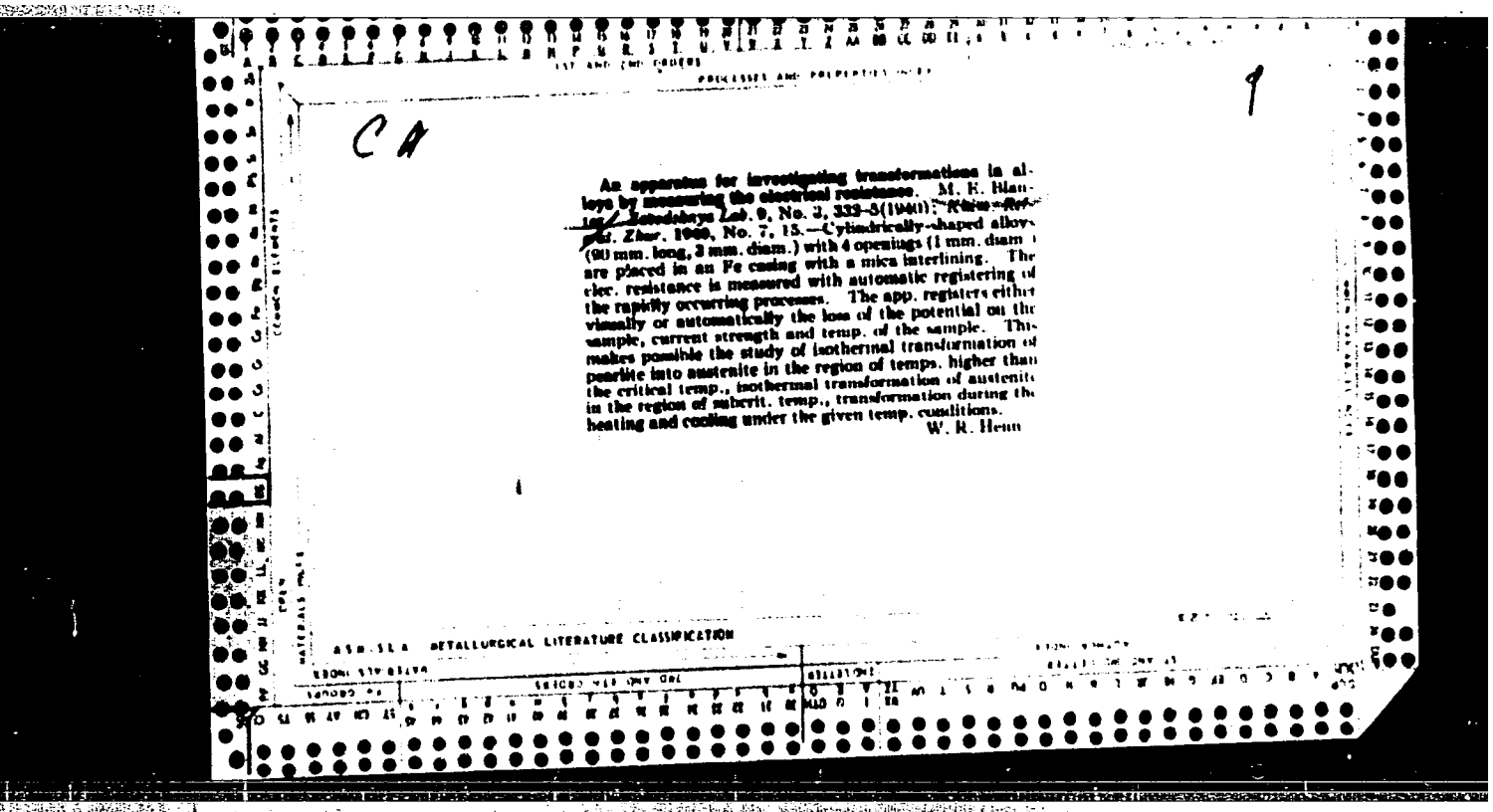
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



9

The transformation of pearlite into austenite. I. I Mirkin and M. N. [redacted] *Trudy Moskov. Inst. Stali im. I. V. Stalina* [redacted] 482 33; *Chem. Zentr.* 1940, I, 378.—A method and app. were developed with which the elec. resistance of a specimen could be detd. in relation to the temp. Such detns. made on a no. of steels showed that in this manner the process of pearlite transformation into austenite and the process of carbide soln. could be investigated both at const. temp. and under conditions of changing temp. The heating and cooling curves so obtained for 2 steels contg. 0.68 and 1.1% C at temps. between 650 and 1100° showed distinctly the hysteresis of the transformation during heating and cooling. Curves obtained for some Cr steels show the increase in the elec. cond. of the α-Fe with temp. and the fact that it is not converted into the austenite condition. In the case of specimens contg. 0.1% C and 0.08% Cr and having a lamellar pearlite structure, the transformation of the pearlite began at first slowly, was then accelerated and finally died away slowly. Increasing the temp. of testing from 730 to 760–75° essentially accelerated the pearlite transformation. M. G. Mowe

ASM-ELA METALLURGICAL LITERATURE CLASSIFICATION



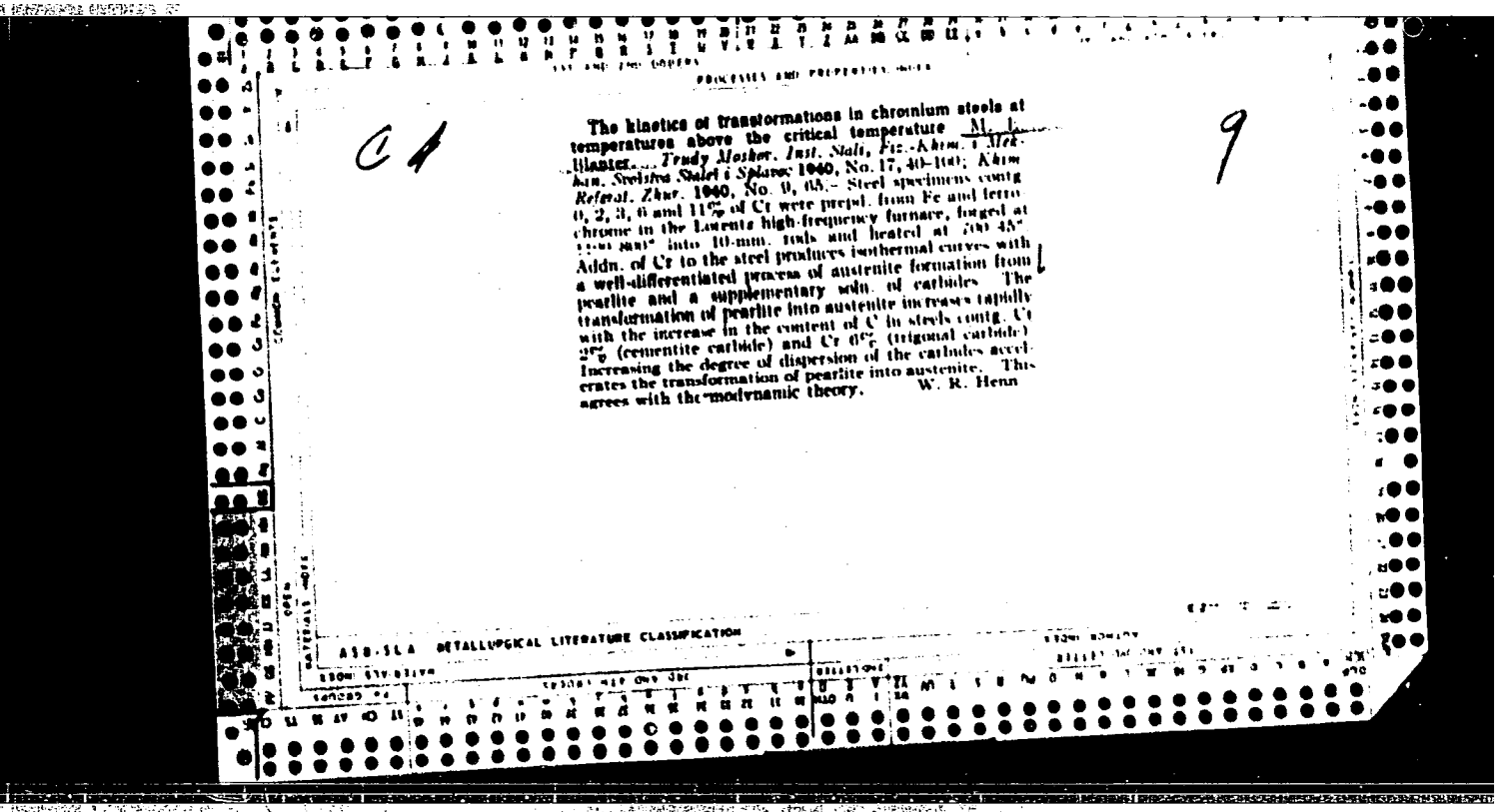
CA

9

An apparatus for investigating transformations in alloys by measuring the electrical resistance. M. E. Blanter, Zavodskaya Lab. 9, No. 2, 333–5(1940).—Rev. Met. Zhur. 1940, No. 7, 15.—Cylindrically-shaped alloys (90 mm. long, 3 mm. diam.) with 4 openings (1 mm. diam. are placed in an Fe casing with a mica interlining. The elec. resistance is measured with automatic registering of the rapidly occurring processes. The app. registers either visually or automatically the loss of the potential on the sample, current strength and temp. of the sample. This makes possible the study of isothermal transformation of pearlite into austenite in the region of temps. higher than the critical temp., isothermal transformation of austenite in the region of subcrit. temp., transformation during the heating and cooling under the given temp. conditions.

W. R. Heun

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

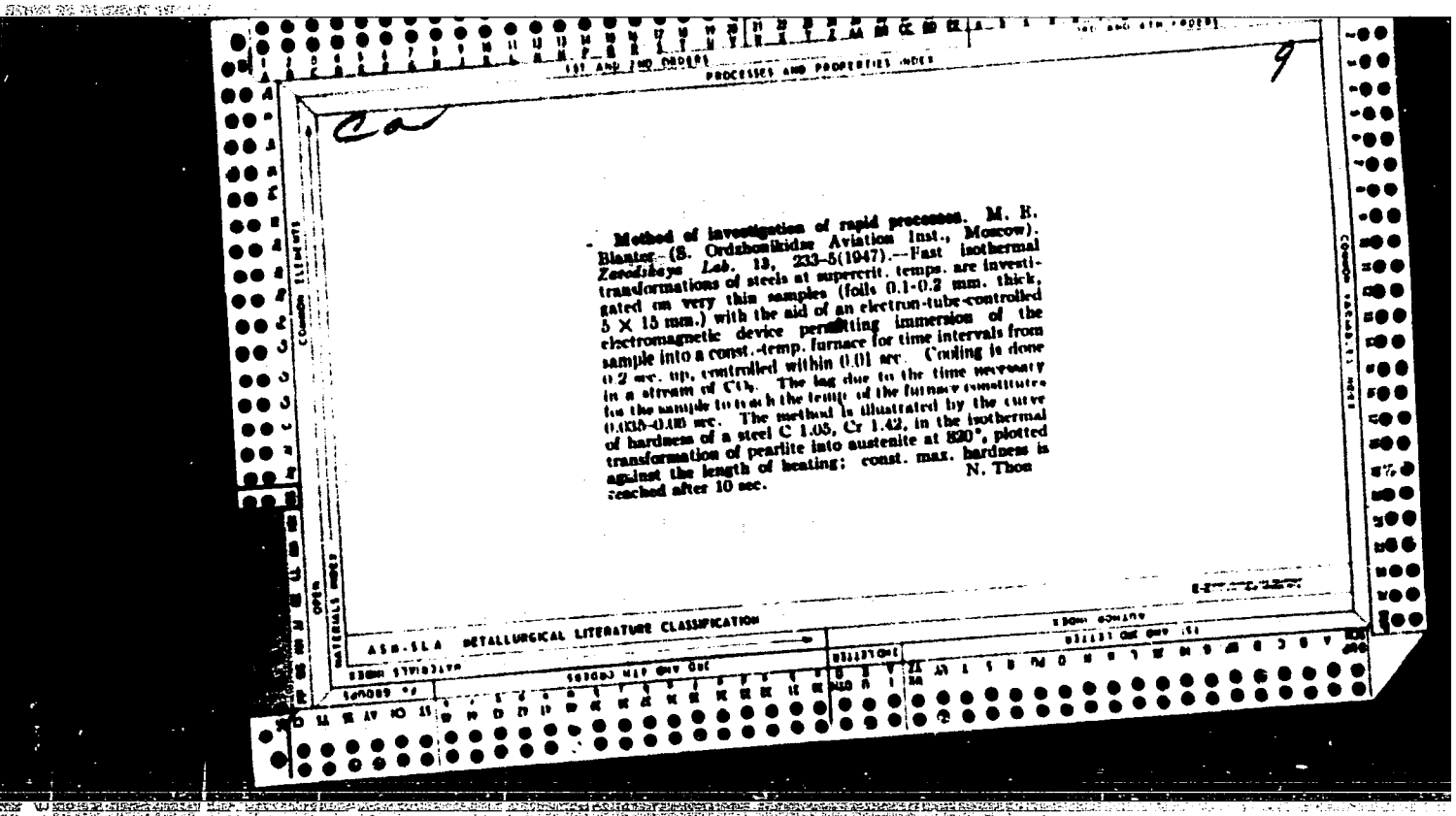


C4

9

The kinetics of transformations in chromium steels at temperatures above the critical temperature M. L. Bliaster. *Trudy Moskov. Inst. Stali, Fiz.-Khim. i Mekh. Issledov. Stalei i Splavov* 1940, No. 17, 40–101; *Khim. Referat. Zhur.* 1940, No. 9, 65.– Steel specimens contg 0, 2, 3, 6 and 11% of Cr were prepd. from Fe and ferro-chrome in the Laurents high-frequency furnace, forged at 1100–900° into 10-mm. rods and heated at 700–45° Addn. of Cr to the steel produces isothermal curves with a well-differentiated process of austenite formation from pearlite and a supplementary soln. of carbides. The transformation of pearlite into austenite increases rapidly with the increase in the content of C in steels contg. Cr 2% (cementite carbide) and Cr 6% (trigonal carbide). Increasing the degree of dispersion of the carbides accelerates the transformation of pearlite into austenite. This agrees with the thermodynamic theory. W. R. Henn

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION



Method of investigation of rapid processes. M. B. Blanter (S. Ordzhonikidze Aviation Inst., Moscow). *Zavodskaya Lab.* 13, 233–5(1947).—Fast isothermal transformations of steels at supercrit. temps. are investigated on very thin samples (foils 0.1-0.2 mm. thick, 5 × 15 mm.) with the aid of an electron-tube-controlled electromagnetic device permitting immersion of the sample into a const.-temp. furnace for time intervals from 0.2 sec. up, controlled within 0.01 sec. Cooling is done in a stream of CO_2. The lag due to the time necessary for the sample to reach the temp. of the furnace constitutes 0.035–0.08 sec. The method is illustrated by the curve of hardness of a steel C 1.05, Cr 1.42, in the isothermal transformation of pearlite into austenite at 820°, plotted against the length of heating; const. max. hardness is reached after 10 sec.

N. Thon

BLANTER, M. E.

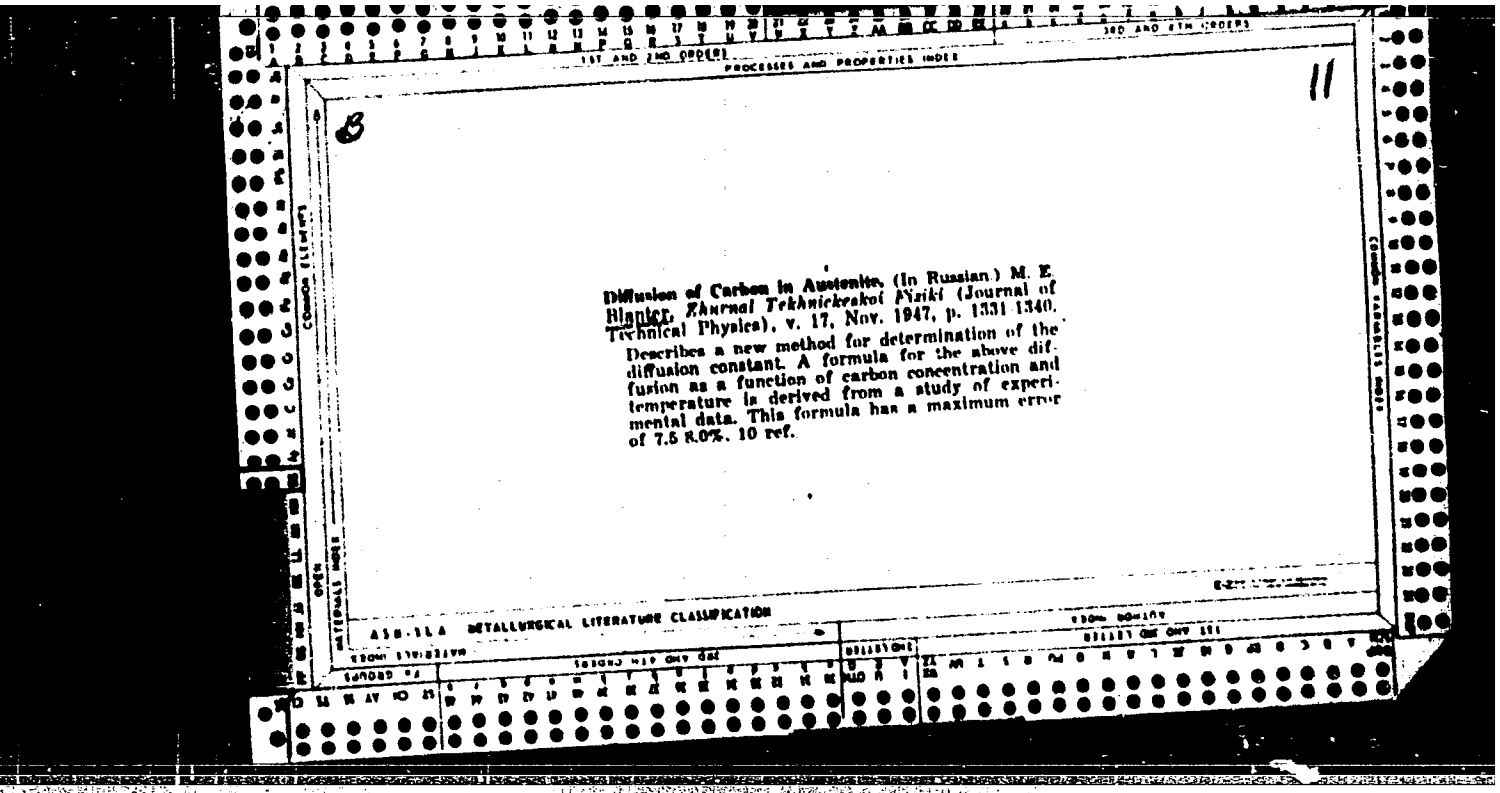
USSR/Resistance, Electrical - Changes May 1947
Alloys

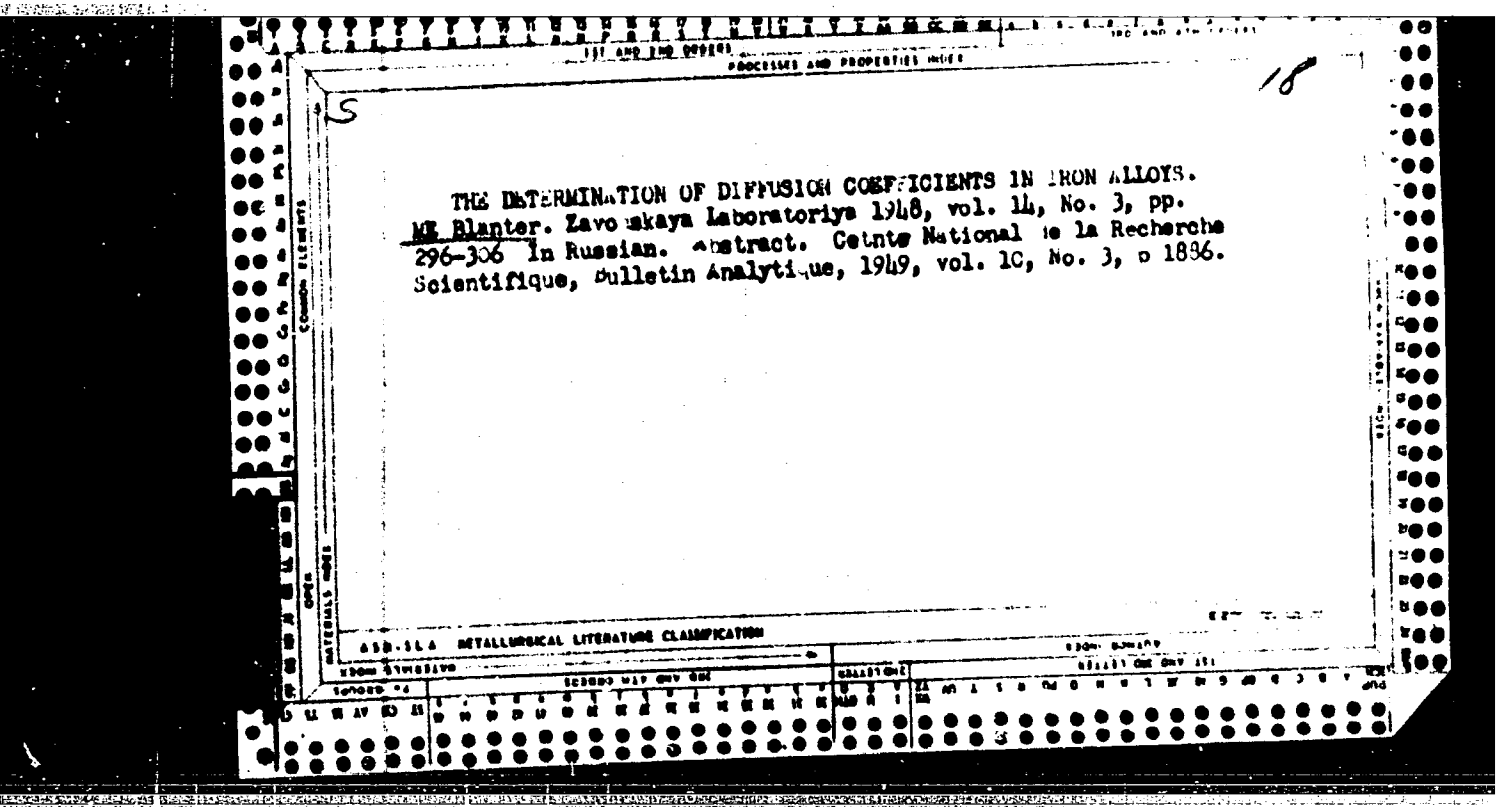
"The Electrical Resistance of Fe-Cr-C Alloys at High Temperature," M. E. Blanter, 8 pp

"Zhur Eksp i Teor Fiz" Vol XVII, No 5

A study of the variation in electric resistance of chrome steel with a chrome content from 0 to 20.4% and oxygen from 0.12 to 1.41% in the interval 20 to 1200° C.

11150





S

18

THE DETERMINATION OF DIFFUSION COEFFICIENTS IN IRON ALLOYS.
ME Blanter. Zavodskaya Laboratoriya 1948, vol. 14, No. 3, pp.
296-306 In Russian. Abstract. Centre National de la Recherche
Scientifique, Bulletin Analytique, 1949, vol. 10, No. 3, p 1896.

PA 4/49T67

BLANTER, M. YE.

USSR/Metals Apr 48
Iron Alloys
Metallography

"Quantitative Microstructure Analysis of Alloys,"
M. Ye. Blanter, Moscow Aviation Inst, 8 pp

"Zavod Lab" Vol XIV, No 4

Solves problem statistically. Gives example showing how to determine carbon content of 0.86% C steel. Specimen had been quenched and annealed at 700° for 6 hours, and etched with mixture of 4% picric and nitric acids in alcohol. Counting cementite grains by Blanter's method, carbon content worked out at 0.82%. Gives similar method to estimate relative weights of constituents of alloys. PA 4/49T67

BLANTER, M. YE.

PA 4/49T68

[illegible]/Metals
Iron Alloys
Metallography

Apr 48

"Quantitative Metallographic Method of Analysis," M. Ye. Blanter, S. A. Saltykov, 1 p

"Zavod Lab" Vol XIV, No 4

Subject method of analysis was described by Saltykov in 1946. Here he replies to ensuing discussion. Method of deriving basic formula is sound, as is the formula itself. The experimental formula can be confirmed only for isometric structures in two special cases, but it is reasonable to suppose that

4/49T68

[illegible]/Metals (Contd)

Apr 48

it holds good for other cases. Approximate formulas for estimating cementite area in granular and laminated pearlite are limited in application; secant method should therefore be used.

4/49T68

BLANTER, M. YE.

PA 64T62

USSR/Metals
Austenite
Alloy Systems

Apr 1948

"Mechanism of Eutectoid Disintegration of Alloyed Austenite," M. Ye. Blanter, 12 pp

"Zhur Tekh Fiz" Vol XVIII, No 4

Discusses Meylen's theory on the mechanism of subject disintegration. Experimental data rejects this theory. Theoretical studies show possibility of any type of progression for eutectoid disintegration. Primary alloy of the products of disintegration conforms to the average alloying of the transfer structure of austenite, while the basic process of determining the speed of the eutectoid disintegration is based on the diffusion of carbon through the austenite alloy. Submitted 17 Nov 1947.

64T62

1. YAMANSKIY, YA. S., FINKEL'SHTEYN, B. N., AND BLANTER, M. YE.

2. USSR (600)

4. Physics and Mathematics

7. Physical Fundamentals of Metal Science, Ya. S. Yamanskiy, B. N. Finkel'shteyn, and M. Ye. Blanter. (Atomic Structure of Alloys, Moscow, Metallurgy Press, 1949). Reviewed by V. D. Kuznetsov and V. A. Zhdanov, Sov. Kniga, No 4, 1950.

9. [redacted] Report U-3081, 16 Jan 1953, Unclassified.

BLANTER, M. YE.

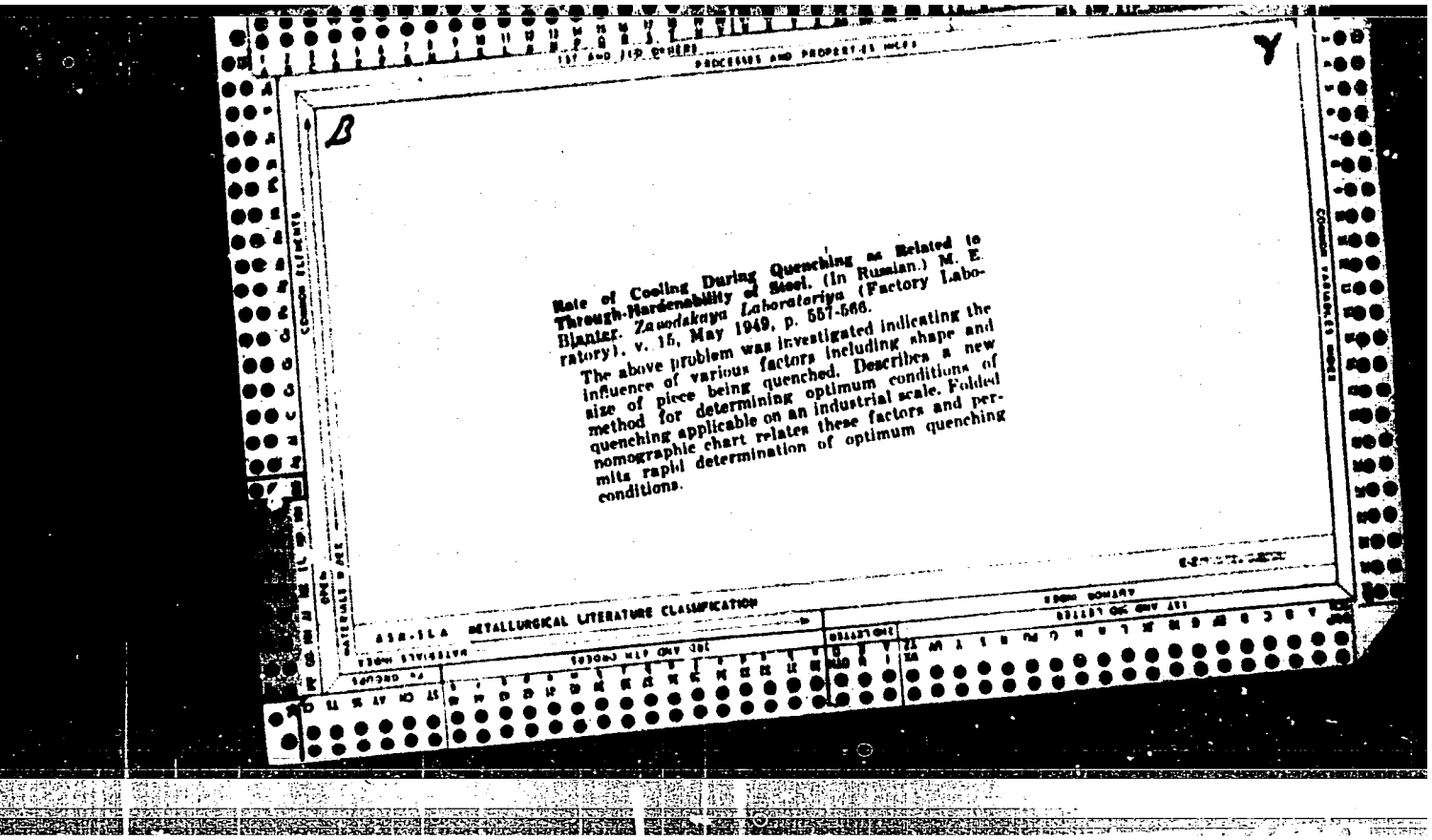
29060- Metod Opredeleniya Kriticheskoy Skorosti Zakalki. Zavodskaya Laboratoriya 1949, No. 8, s. 1077-79

SO: Letopis' Zhurnal'nykh Statey, Vol. 39, Moskva, 1949

BLANTER, M. YE.

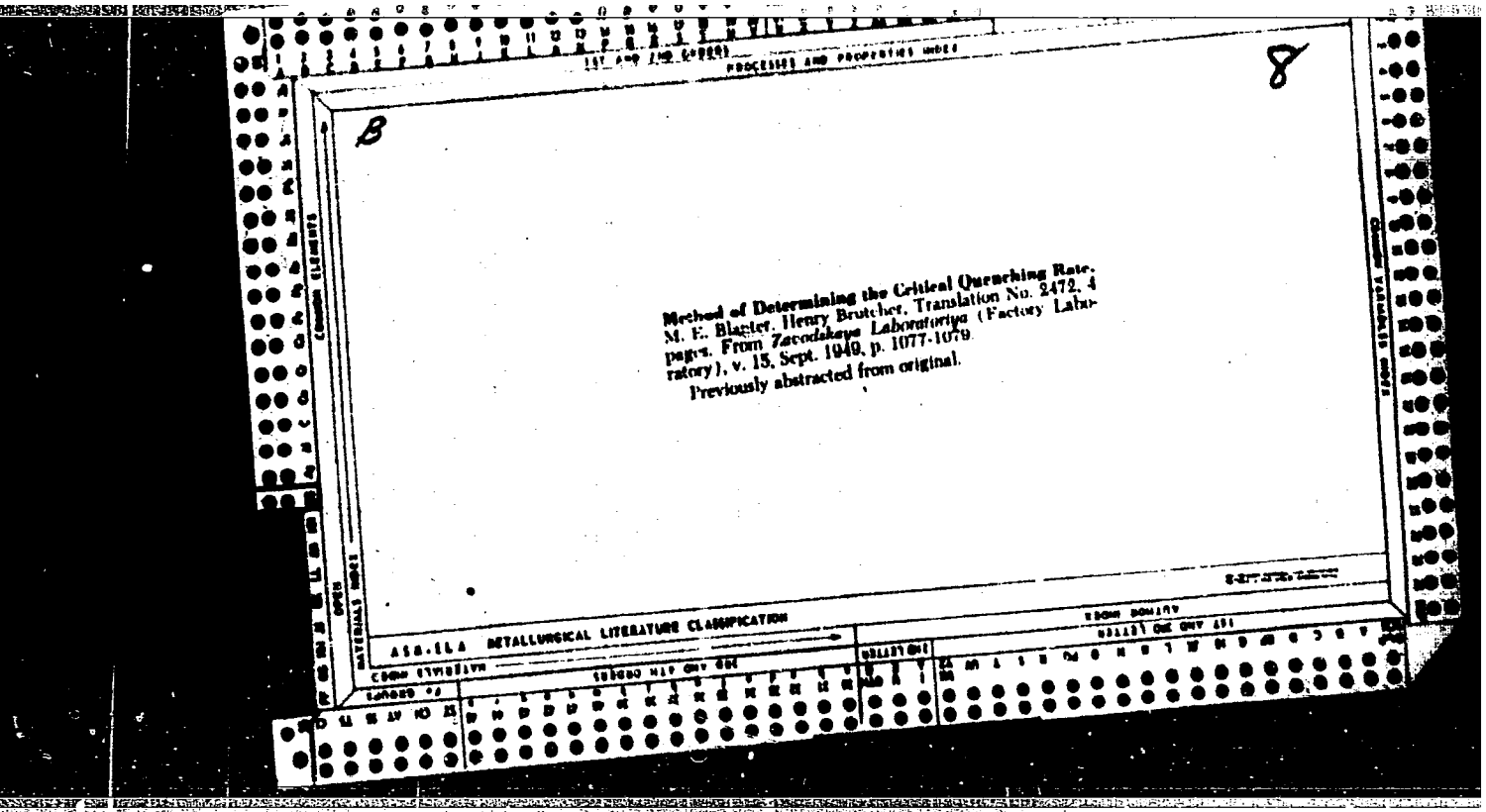
29052- O Kolichestvennom Mikrostrukturnom Analize. (Otvet Na Odnoim. Stat'yu M. B. Smolovicha V Zhurn. "Zavodskaya Laboratoriya", 1949, No. 3 S Primech. Red) Zavodskaya Laboratoriya, 1949, No. 9, S. 1126-27

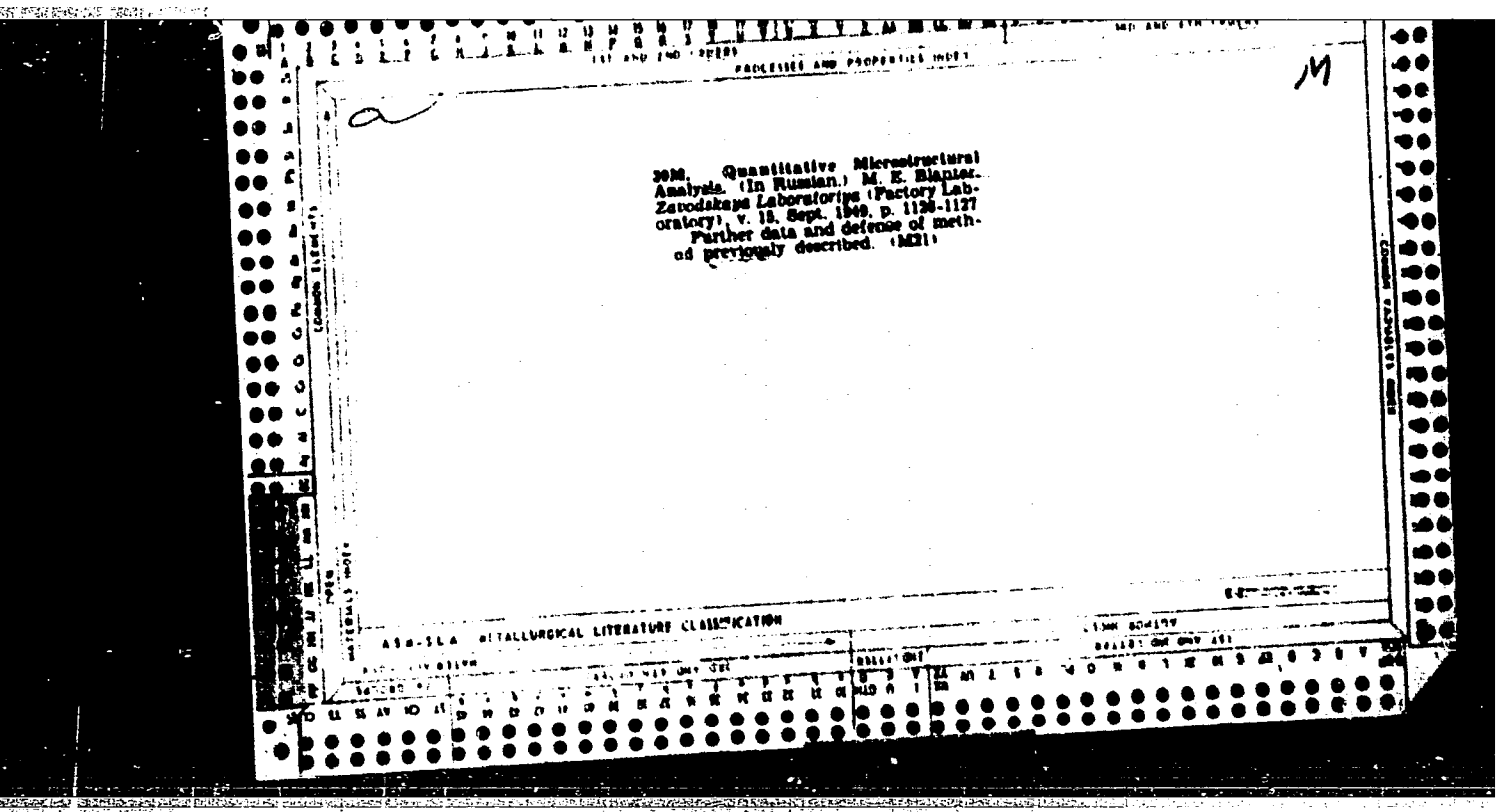
SO: Letopis' Zhurnal'nykh Statey, Vol. 39, Moskva, 1949



Rate of Cooling During Quenching as Related to Through-Hardenability of Steel. (In Russian.) M. E. Blanter. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 557-566.

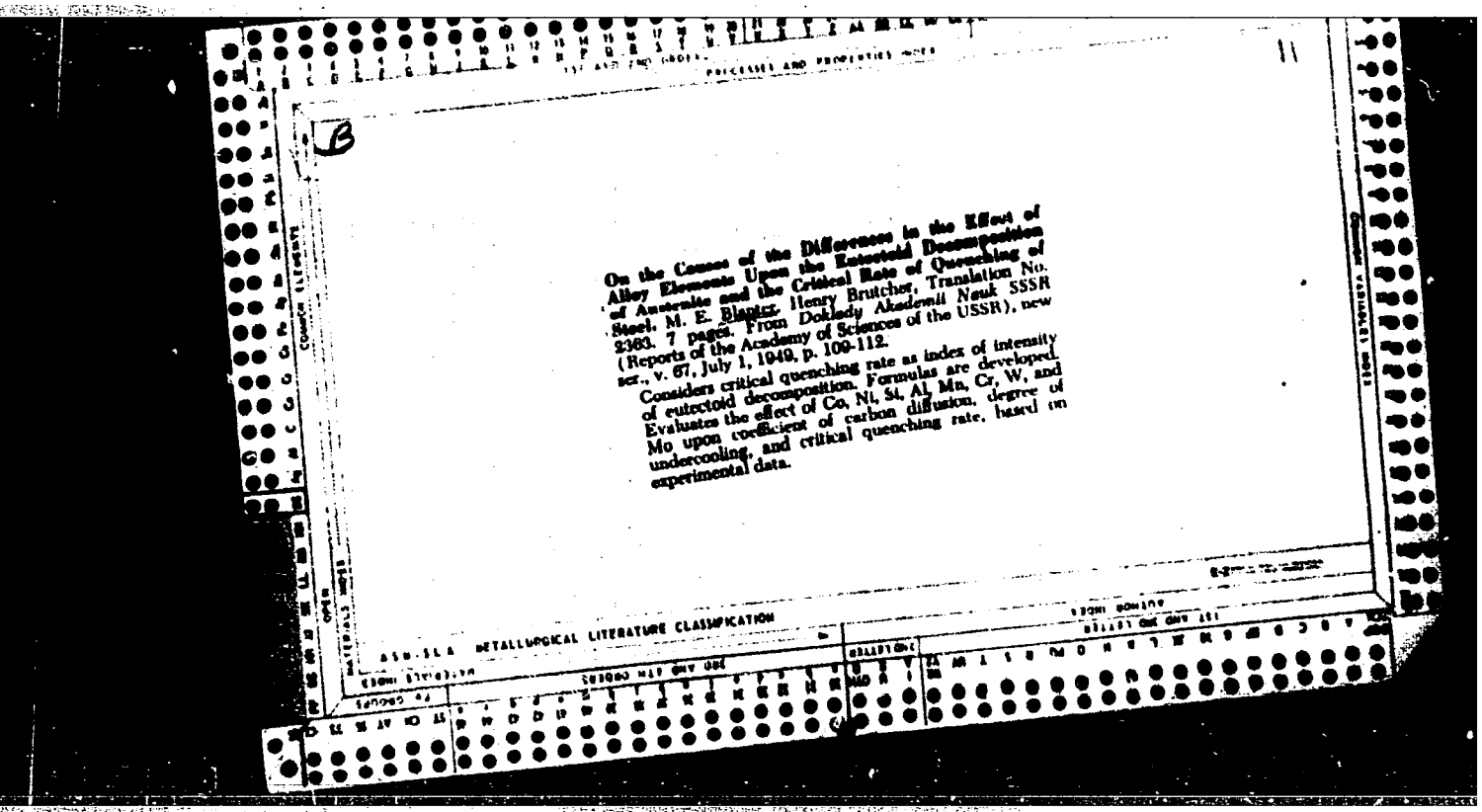
The above problem was investigated indicating the influence of various factors including shape and size of piece being quenched. Describes a new method for determining optimum conditions of quenching applicable on an industrial scale. Folded nomographic chart relates these factors and permits rapid determination of optimum quenching conditions.





2MM. Quantitative Microstructural Analysis. (In Russian.) M. E. Blanter. Zavodskaya Laboratoriya (Factory Laboratory), v. 15, Sept. 1949. p. 1126-1127
Further data and defense of method previously described. (M21)

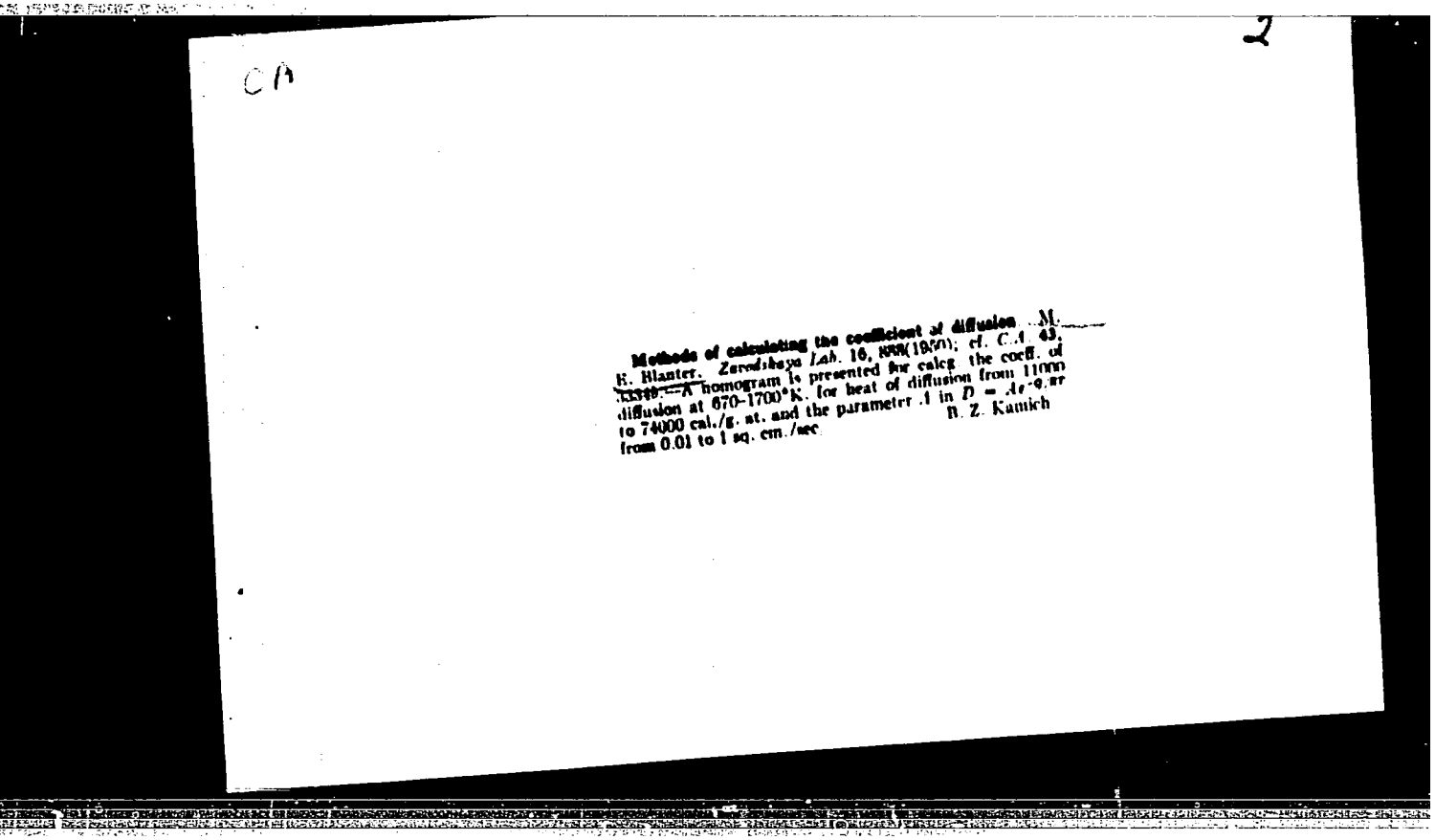
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



On the Causes of the Difference in the Effect of Alloy Elements Upon the Eutectoid Decomposition of Austenite and the Critical Rate of Quenching of Steel. M. E. Blanter. Henry Brutcher, Translation No. 2363. 7 pages. From Doklady Akademii Nauk SSSR (Reports of the Academy of Sciences of the USSR), new ser., v. 67, July 1, 1949, p. 109-112.

Considers critical quenching rate as index of intensity of eutectoid decomposition. Formulas are developed. Evaluates the effect of Co, Ni, Si, Al, Mn, Cr, W, and Mo upon coefficient of carbon diffusion, degree of undercooling, and critical quenching rate, based on experimental data.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

2

Methods of calculating the coefficient of diffusion. M. K. Blanter. *Zavodskaya Lab.* 16, 888(1950); cf. *C.A.* 43, 8319—A homogram is presented for calcg. the coeff. of diffusion at 670–1700°K. for heat of diffusion from 11000 to 74000 cal./g. at. and the parametrr A in $D = Ae^{-Q/RT}$ from 0.01 to 1 sq. cm./sec. B. Z. Kamich

PA 156T70

USSR/Metals - Austenite
Nickel

Feb 50

"The Influence of Nickel on the Diffusion of Carbon in Austenite," M. Ye. Blanter, 5 pp

"Zhur Tekh Fiz Vol XX, No 2 217-21

Studies influence of nickel content, carbon concentration, and temperature on diffusion of carbon in austenite. Establishes that value of coefficient of diffusion increases continuously with increase in degree of alloying. Decrease in heat of diffusion for constant parameter A or slight lowering

156T70

USSR/Metals - Austenite (Contd)

Feb 50

(at 18% Ni) is cause of this fact. Expresses temperature dependence of coefficient of diffusion of carbon in austenite in mathematical formulas for various contents of nickel. Submitted 23 Dec 48.

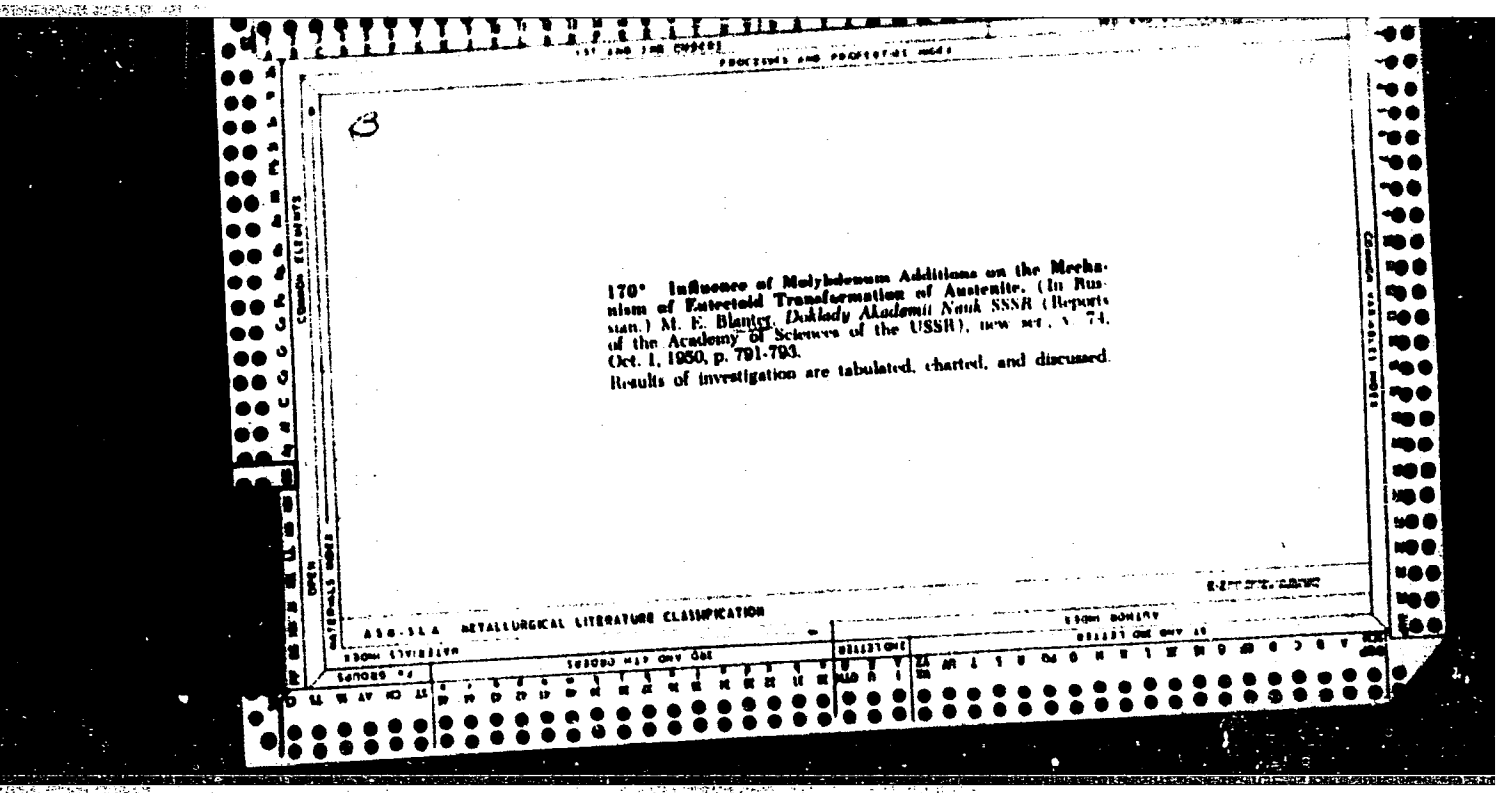
156T70

BLANTER, M. YE.

S

Influence of Cobalt on the Diffusion of Carbon in Austenite. M. K. Blaniar. (*Zhurnal Tekhnicheskoy Fiziki*, 1950, **20**, 1001; *Hutnické Listy*, 1951, **6**, Feb., 91). [In Czech]. The influence of cobalt on the diffusion of carbon in steel was investigated. The diffusion coefficient of carbon increases, at all carbon contents with cobalt increasing up to 6%, at temperatures up to about 1200° C., and remains unchanged with further increase in cobalt; at lower temperatures the coefficient increases up to a cobalt content of 11% and remains unchanged

with higher cobalt. Many test data are presented. — C. B.



170* Influence of Molybdenum Additions on the Mechanism of Eutectoid Transformation of Austenite. (In Russian.) M. E. Blantter. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 74, Oct. 1, 1950, p. 791-793.
Results of investigation are tabulated, charted, and discussed.

BLANTER, M. Ye.

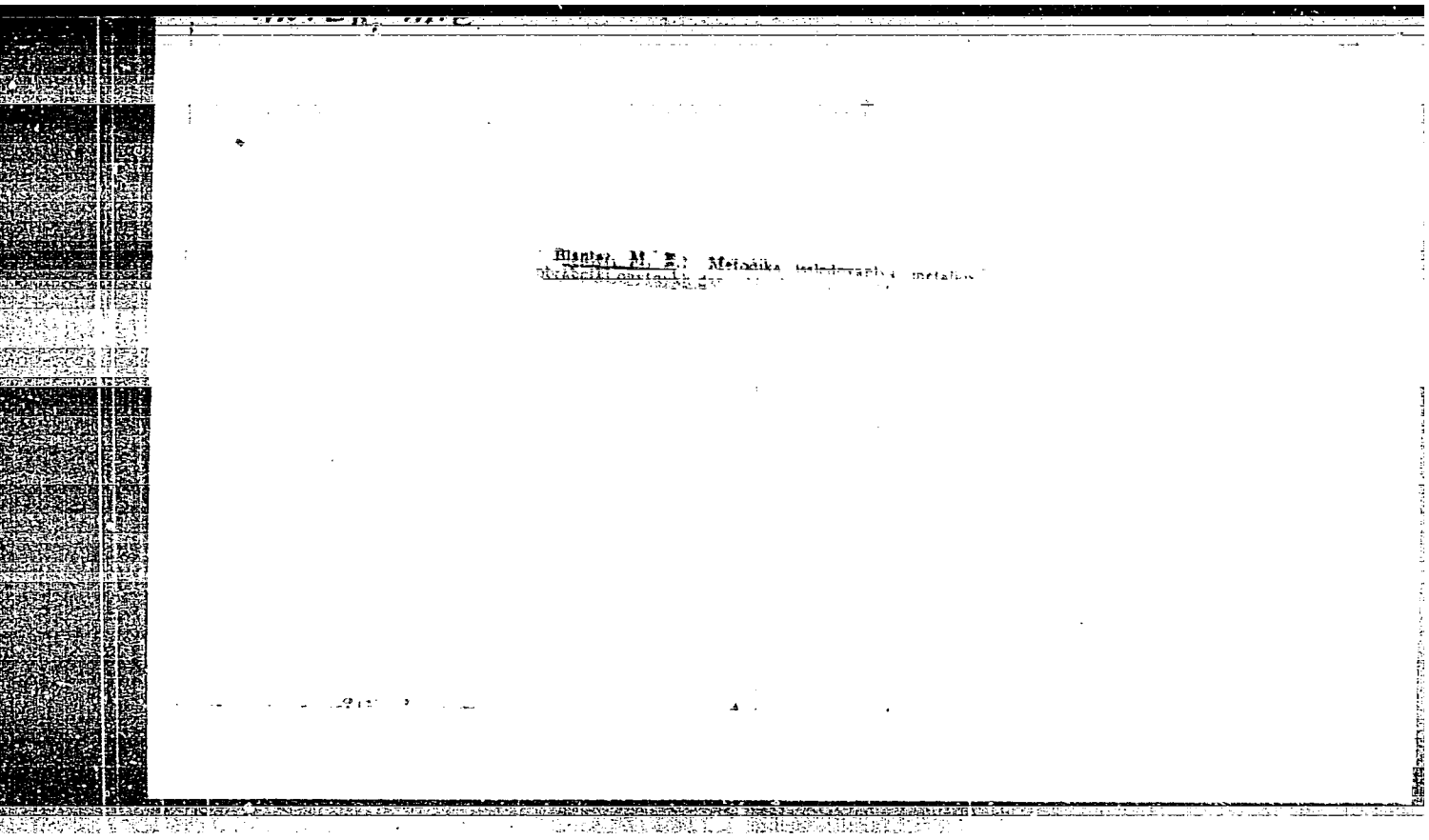
USSR/Metals - Austenite, Manganese Jul 51

"Effect of Manganese on Diffusion of Carbon in Austenite," M. Ye. Blanter

"Zhur Tekh Fiz" Vol XXI, No 7, pp 818-821

Data on carbon diffusion effected by nickel and cobalt were previously published by Blanter (cf. "Zhur Tekh Fiz" Vol XVII, No 2, 1950; Vol XX, No 2, 1940; Vol XX, No 8, 1950). Here he outlines results of systematic study of effect of manganese on diffusion consts, a subject not yet sufficiently studied. Applies special method previously described. (cf. "Zavod Lab" No 3, 1948). Submitted 18 May 50.

LC



[illegible], M. Ye.

POGODIN-ALEKSEYEV, G.I., doktor tekhnicheskikh nauk, professor; BOLKHOVITINOV, N.F., doktor tekhnicheskikh nauk, professor, retsenzent; BLANTER, M.Ye., doktor tekhnicheskikh nauk, professor, retsenzent; POPOVA, S.N., tekhnicheskiy redaktor.

[Structure and strength of metals and alloys; collection of scientific essays] Struktura i prochnost' metallov i splavov. Sbornik nauchnykh rabot. Moskva, Gos. nauchno-tekhn. izd-ve mashinostroit. lit-ry, Vol. 5. 1953. 182 p. (MLRA 7:9)

(Metalwork) (Metals--Testing) (Metallography)

BLANTER, M. Ye.

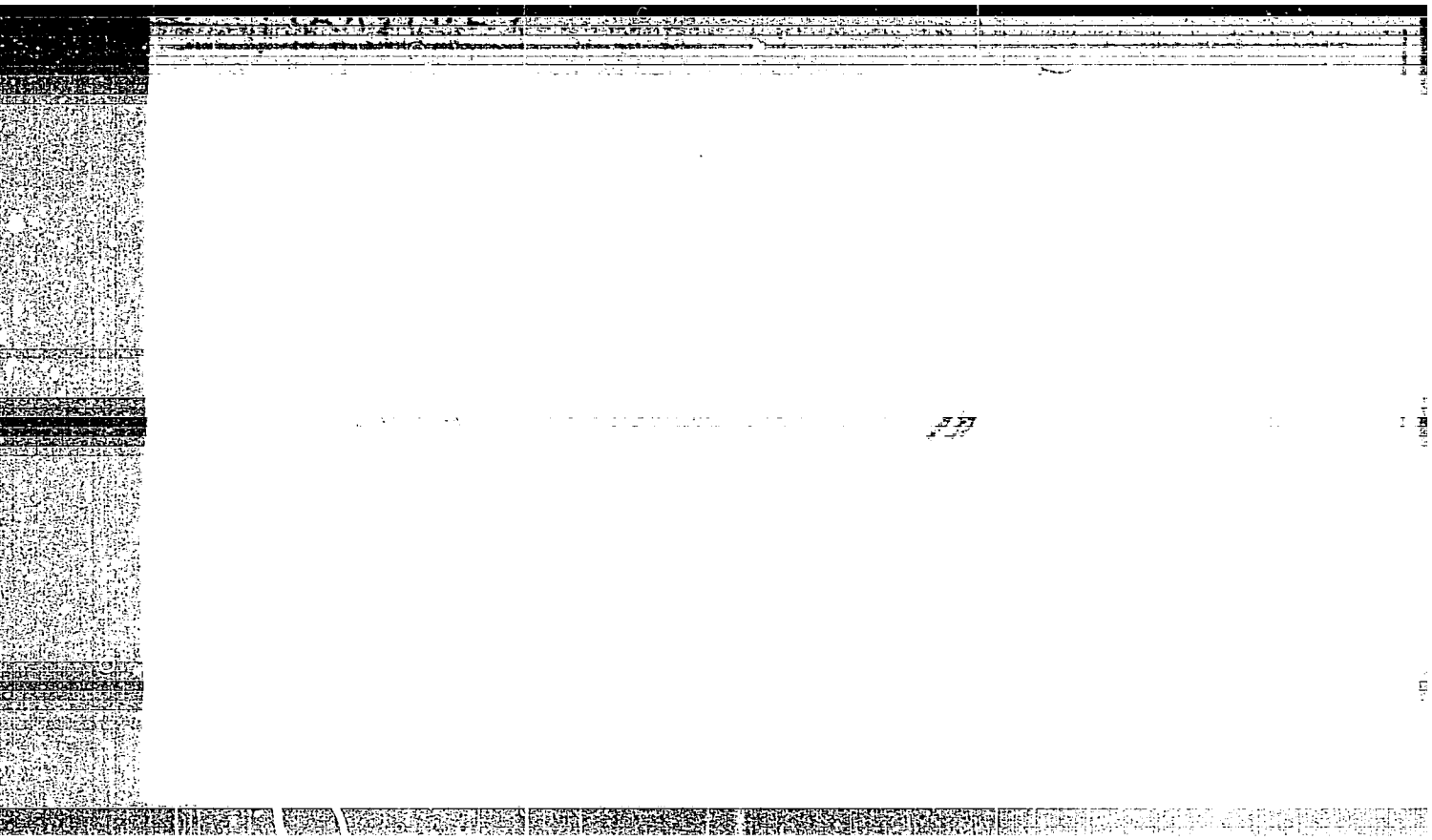
"Technological Importance of Hardenability of Steel," pp 49/60 in Modern Methods of Heat Treating Steel by Dom Inzhenera i Tekhnika imeni F E Dzerzhinskovo. Gosudarstvennoye Nauchno-Tekhnicheskoye Izdatel'stvo Mashinostroitel'noy Literatury, Moscow (1954) 404 pp.

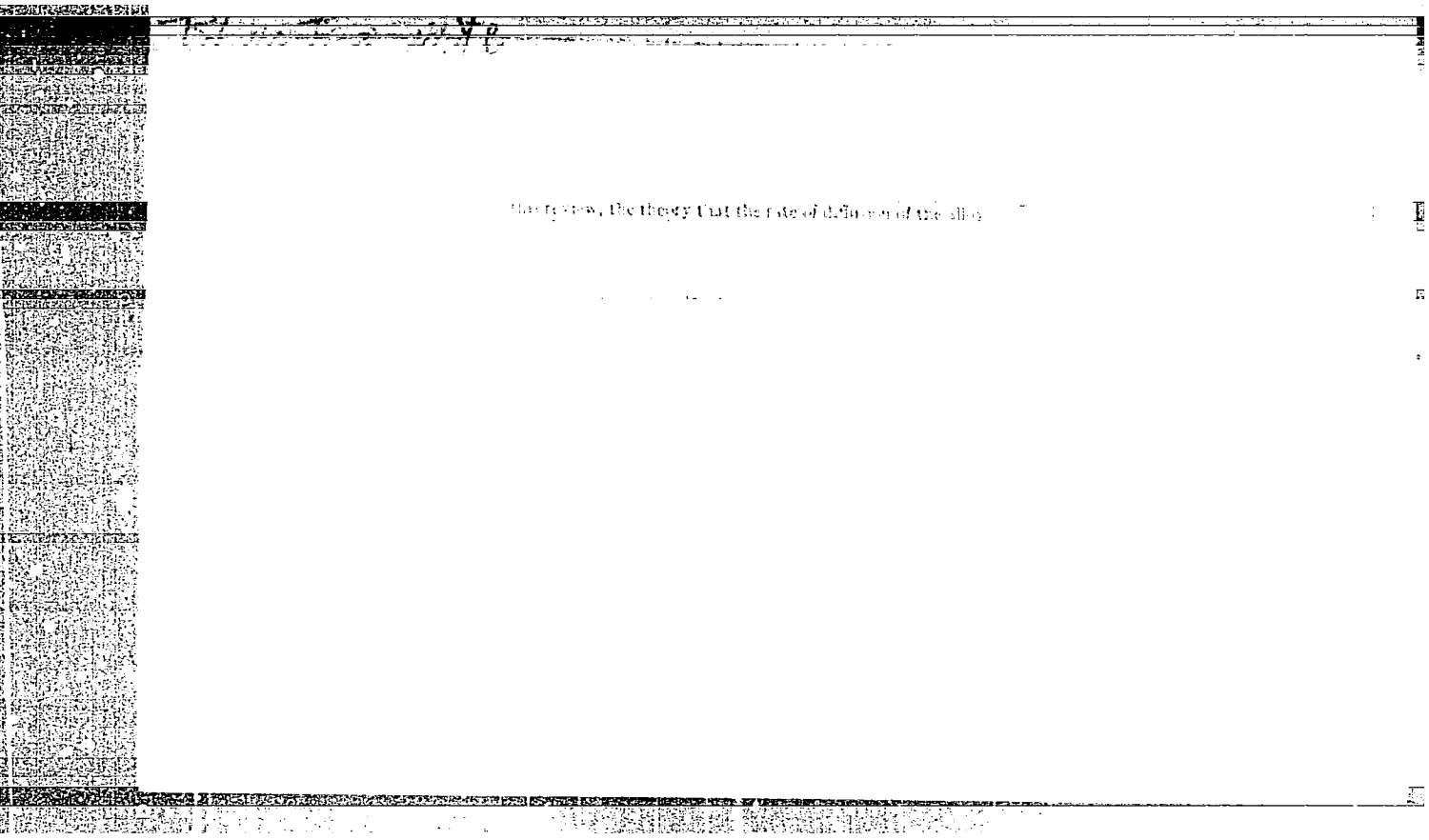
B-86350, 30 Jun 55

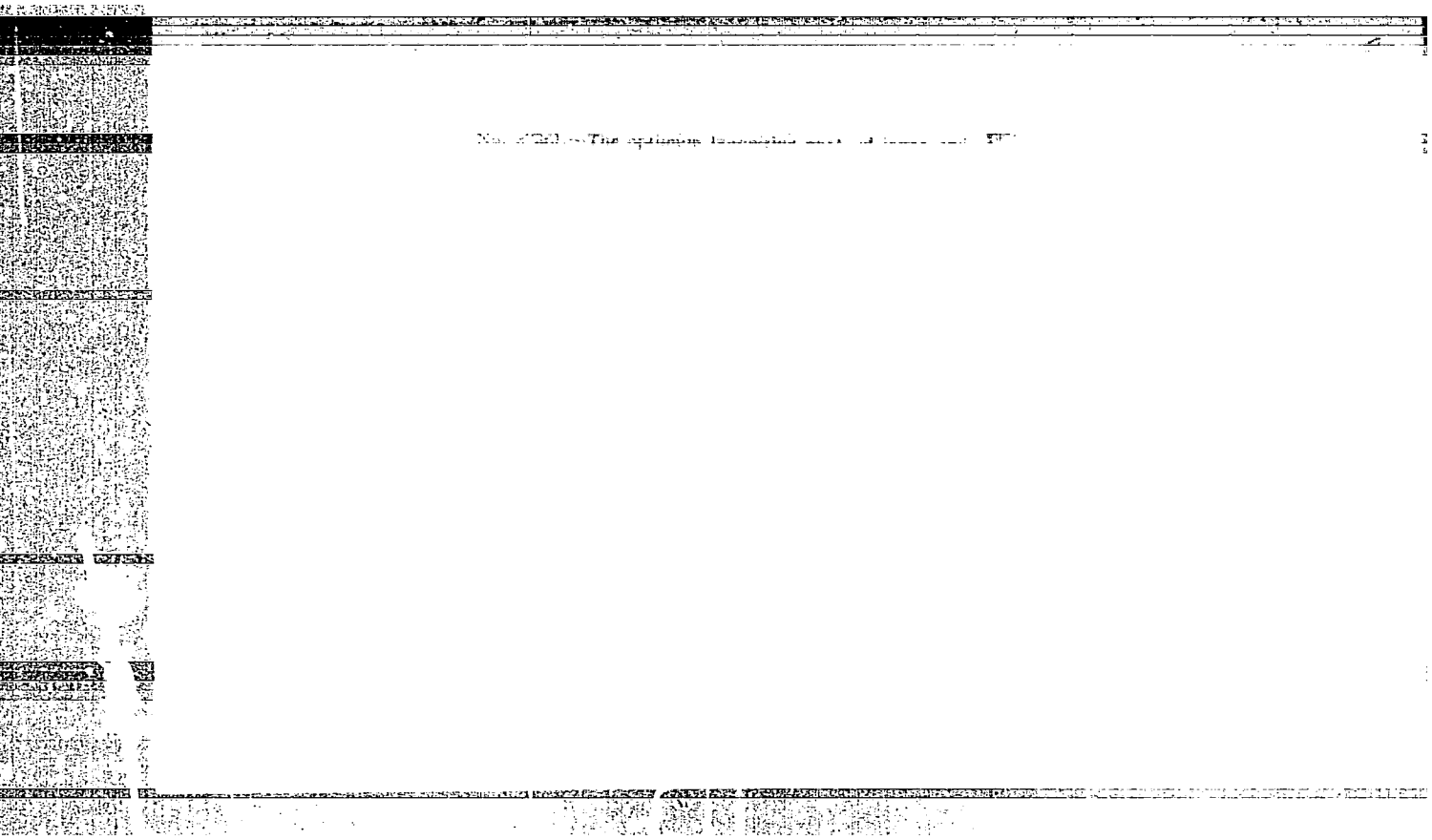
TA459.F55 TREASURE ISLAND BOOK REVIEW AID 847 - M

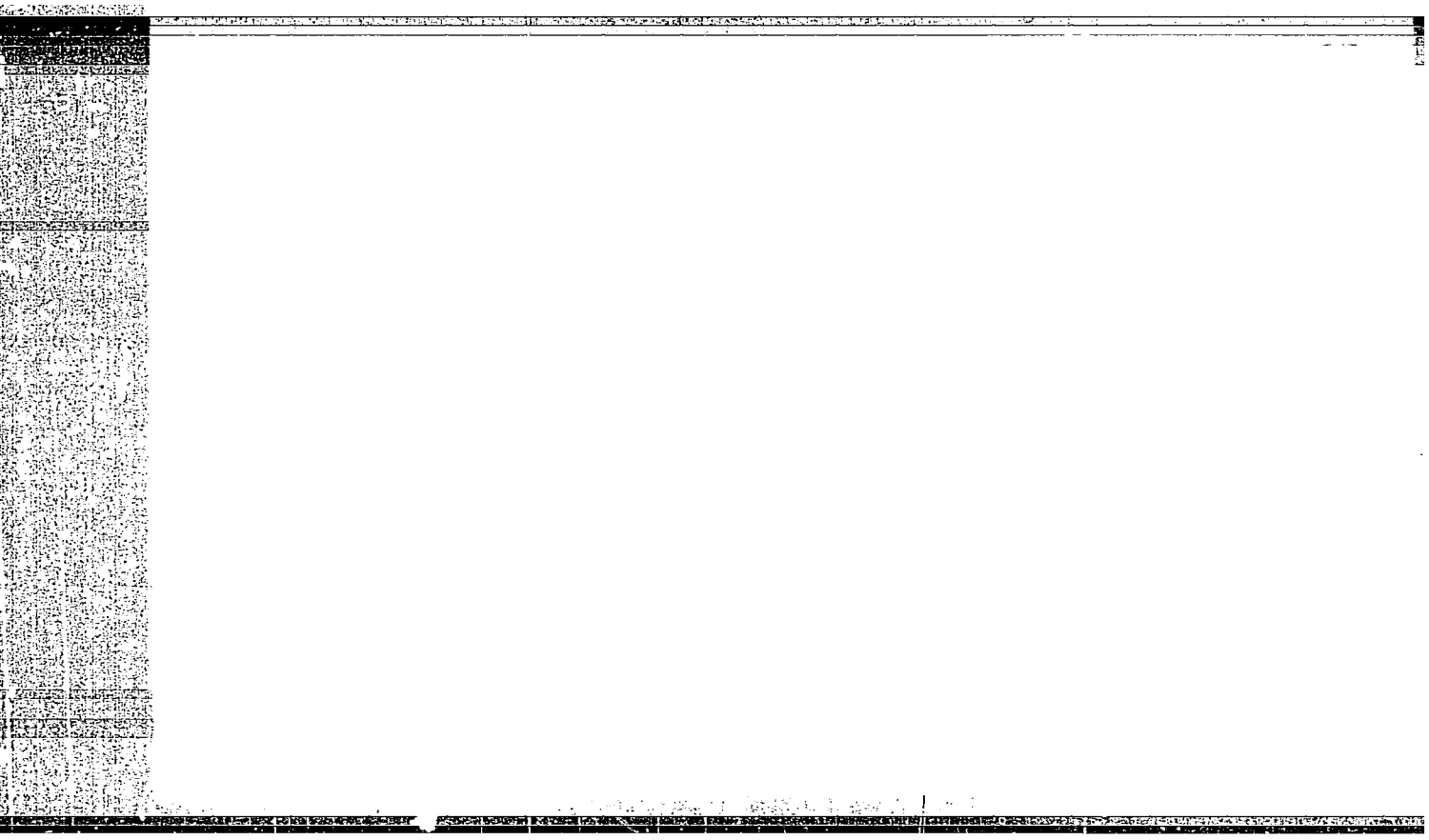
BLANTER, M. YE., S. S. GORELIK, N. S. FASTOV, UMANSKIY, YA. S., DISHKIN, S. T. and FINKEL'SHTEYN, B. N.
FIZICHESKIYE OSNOVY METALLOVEDENIYA (Principles of physical metallurgy). Metallurgizdat, 1955. 724 p., diagrs., tables, photos. 10,000 copies. printed.

ANALYSIS AND EVALUATION:
This book on physical metallurgy is compiled by a group of prominent Soviet scientists and is based on a very voluminous literature, monographic and periodical, mostly by Soviet writers. It is not a textbook but an outline. of present-day achievement in the understanding of the physical principles of metallography and a survey of physical metallurgy problems as seen by Soviet Scientists. Two main problems of theoretical physical metallurgy are emphasized: the theory of phase structure and the throry of phase formation. Presented in addition are the present-day concepts concerning plastic deformation of metals, recovery and recrystallization, and finally a study of the connection between the structure and composition of alloys and their strength.









APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000205510002-6"

BLANTER, M.Ye.

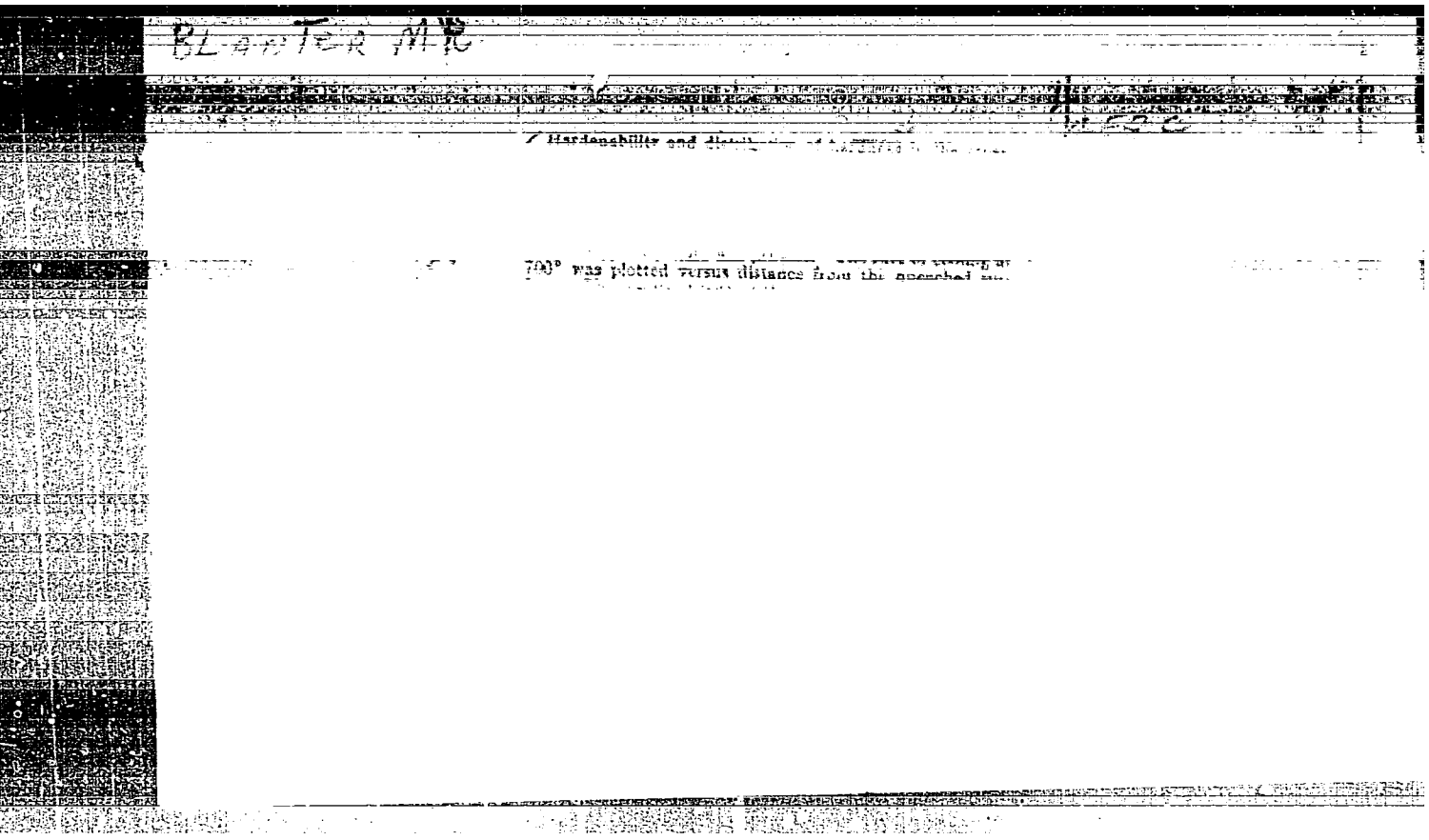
AL'TGAUZEN, O.N., kandidat fiziko-matematicheskikh nauk; BERNSHTEYN, M.L., kandidat tekhnicheskikh nauk; BLANTER, M.Ye., doktor tekhnicheskikh nauk; BOKSHTEYN, S.Z., doktor tekhnicheskikh nauk; BOLKHOVITINOVA, Ye.N., kandidat tekhnicheskikh nauk; BORZDYKA, A.M., doktor tekhnicheskikh nauk; BUNIN, K.P., doktor tekhnicheskikh nauk; VINOGRAD, M.I., kandidat tekhnicheskikh nauk; VOLOVIK, B.Ye., doktor tekhnicheskikh nauk [deceased]; GAMOV, M.I., inzhener; GELLER, Yu.A., doktor tekhnicheskikh nauk; GERELIK, S.S., kandidat tekhnicheskikh nauk; GOL'DENBERG, A.A., kandidat tekhnicheskikh nauk; GOTLIB, L.I., kandidat tekhnicheskikh nauk; GRIGOROVICH, V.K., kandidat tekhnicheskikh nauk; GULYAYEV, B.B., doktor tekhnicheskikh nauk; DOVGALEVSKIY, Ya.M, kandidat tekhnicheskikh nauk; DUDOVTSEV, P.A., kandidat tekhnicheskikh nauk; KIDIN, I.N., doktor tekhnicheskikh nauk; KIPNIS, S.Kh., inzhener; KORITSKIY, V.G., kandidat tekhnicheskikh nauk; LANDA, A.F., doktor tekhnicheskikh nauk; LEYKIN, I.M., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; L'VOV, M.A., kandidat tekhnicheskikh nauk; MALYSHEV, K.A., kandidat tekhnicheskikh nauk; MEYERSON, G.A., doktor tekhnicheskikh nauk; MINKEVICH, A.N., kandidat tekhnicheskikh nauk; MOROZ, L.S., doktor tekhnicheskikh nauk; NATANSON, A.K., kandidat tekhnicheskikh nauk; NAKHIMOV, A.M., inzhener; NAKHIMOV, D.M., kandidat tekhnicheskikh nauk; POGODIN-ALEKSEYEV, G.I., doktor tekhnicheskikh nauk; POPOVA, N.M., kandidat tekhnicheskikh nauk; POPOV, A.A., kandidat tekhnicheskikh nauk; RAKHSHTADT, A.G., kandidat tekhnicheskikh nauk; ROGEL'BERG, I.L., kandidat tekhnicheskikh nauk;

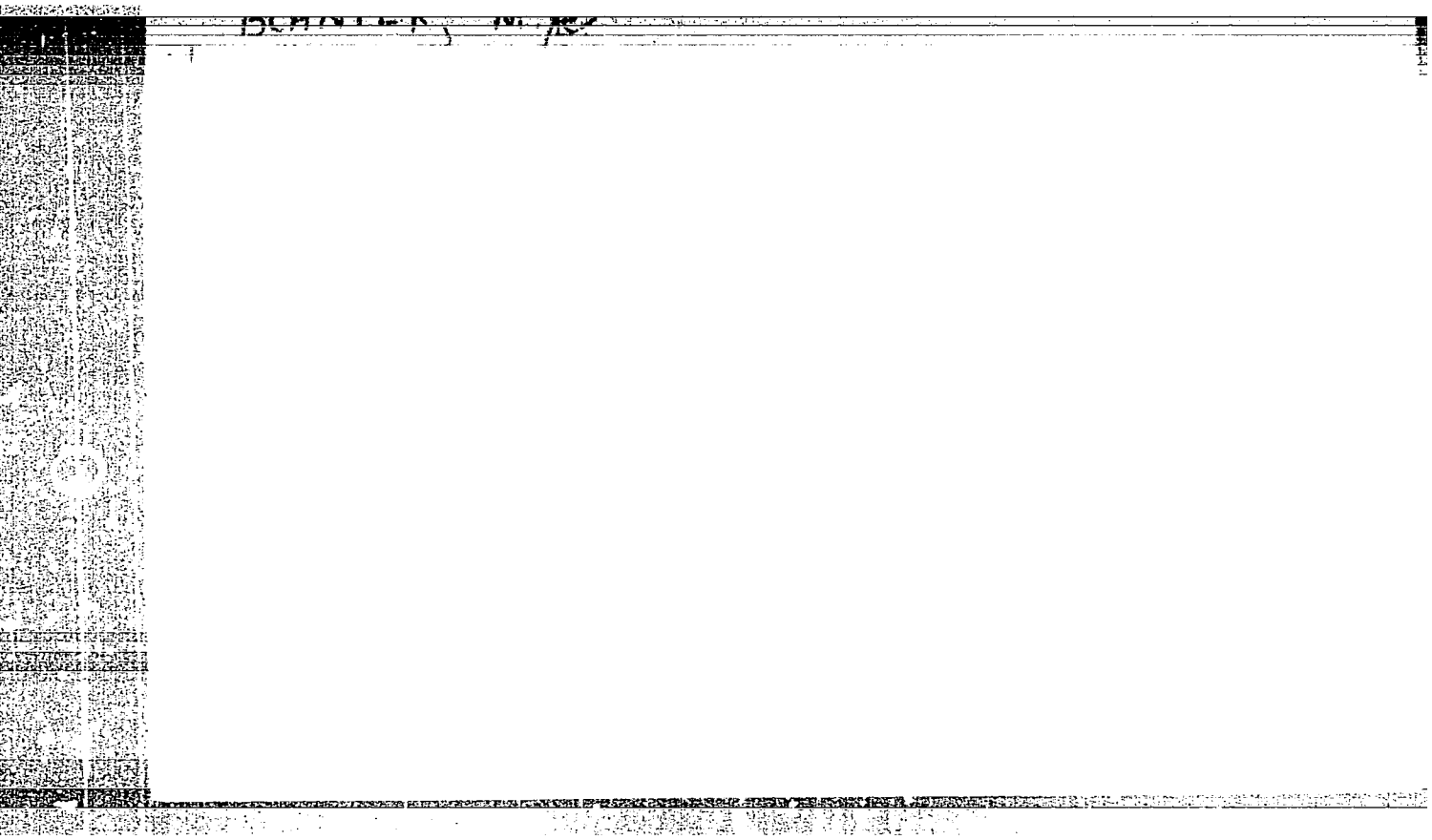
(Continued on next card)

AL'TGAUZEN, O.N.---- (continued) Card 2.
SADOVSKIY, V.D., doktor tekhnicheskikh nauk; SALTYKOV, S.A., inzhener; SOBOLEV, N.D., kandidat tekhnicheskikh nauk; SOLODIKHIN, A.G., kandidat tekhnicheskikh nauk; UMANSKIY, Ya.S., kandidat tekhnicheskikh nauk; UTEVSKIY, L.M., kandidat tekhnicheskikh nauk; FRIDMAN, Ya.B., doktor tekhnicheskikh nauk; KHIMYSHIN, F.F., kandidat tekhnicheskikh nauk; KHRUSHCHEV, M.M., doktor tekhnicheskikh nauk; CHERNASHKIN, V.G., kandidat tekhnicheskikh nauk; SHAPIRO, M.M., inzhener; SHKOL'NIK, L.M., kandidat tekhnicheskikh nauk; SHRAYBER, D.S., kandidat tekhnicheskikh nauk; SHCHAPOV, N.P., doktor tekhnicheskikh nauk; GUDTSOV , N.T., akademik, redaktor; GORODIN, A.M. redaktor izdatel'stva; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor

[Physical metallurgy and the heat treatment of steel and iron; a reference book] Metallovedenie i termicheskaia obrabotka stali i chuguna; spravochnik. Pod red. N.T.Dudtsova, M.L.Bernshteina, A.G. Rakhshtadta. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 1204 p. (MLRA 9:9)

1. Chlen -korrespondent Akademii nauk USSR (for Bunin)
(Steel--Heat treatment) (Iron--Heat treatment)
(Physical metallurgy)





APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000205510002-6"

AUTHORS: Metashop, L.A., Ing. and Blanter, M.Ye. Dr. of Tech. Sc., Prof. (Moscow Aviation Institute).

TITLE: Work hardening recrystallisation and softening of alloyed austenite. (Naklep, rekristallizatsiya i razuprochneniye legirovannogo austenita).

PERIODICAL: "Metallovedeniie i Obrabotka Metallov" (Metallurgy and Metal Treatment), 1957, No.5, pp.15-23 (U.S.S.R.)

ABSTRACT: The influence of the content in alloying elements and of the degree of preliminary plastic deformation on the recrystallisation and softening of the austenite are investigated on alloy steels of compositions such that they are able to retain the austenitic structure under very high degrees of deformation; the austenite contained basically 1.0 to 1.2% C and about 12% Mn. The chemical compositions of the four investigated alloys are given in a Table, p.16. The specimens were plastically deformed by compression on a 50 ton press with a deformation speed of 1.22 and 7.56 mm/min, the limit degree of deformation equalling 35 to 37%. To gain a good idea on the influence of the degree of plastic deformation on the studied phenomena all the alloys were plastically deformed by 5, 12, 18 and 36% respectively. Softening and recrystallisation were investigated after heating from the room temperature to 1100°C, at steps of 50 to 100°C for experimentally determined holding times.

Card 1/3

Work hardening recrystallisation and softening of alloyed austenite. (Cont.)

Simultaneously the softening of work hardened austenite was investigated and also the separation and dissolution of the graphite phase during heating. It was found that the separation-dissolution of carbides and the softening during heating of previously work hardened alloyed austenite proceed independently. This is due to the fact that in these two processes particles participate which have differing mobility under equal temperature conditions. Whilst graphite formation is associated with the diffusion of high mobility carbon particles, the softening of previously work hardened austenite is due to the displacement of atoms of the basic lattice of iron, manganese etc. Change in the alloying or in the degree of plastic deformation influences appreciably the mobility of the metallic atoms of the basic crystal lattice; increase in the chromium content or decrease in the plastic deformations leads to a lower mobility of the metallic atoms and increase in the softening temperature of the austenite. These conclusions contradict accepted views on the inter-relation between the processes of separation-dissolution of particles of a new phase and the softening of a previously work hardened alloy

Card 2/

Work hardening recrystallisation and softening of alloyed austenite. (Cont.)

during heating; this is true only in cases in which atoms of the same type participate in the processes of separation-dissolution of particles of a new phase and in the softening. In such cases the processes are inter-related owing to the equal temperature conditions of the diffusion mobility of these particles. Study of the softening of the work hardened austenite solely by a microscopic method may yield inaccurate data (excessively high temperature values). Particular attention is drawn to the fact that the temperature range of austenite softening is large; complete softening takes place for manganese alloyed austenite in the temperature range 850 to 900°C. 6 graphs, 1 table. 14 references, 7 of which are Russian.

Card 3/3

655

AUTHORS: Blanter, M. Ye., Dr. of Tech. Sc. Prof.,
Novichkov, P. V., Engineer.

TITLE: On the problem and nature of martensitic transformation. (K voprosu o prirode martensitnogo prevrashcheniya).

PERIODICAL: "Metallovedenie i Obrabotka Metallov" (Metallurgy and Metal Treatment), 1957, No.6, pp.11-14 (U.S.S.R.)

ABSTRACT: One of the important features of martensite transformation is the formation of definite quantities of martensite and cessation of further decomposition of the residual austenite for each given cooling temperature below the transformation point. Various hypotheses aimed at explaining this phenomenon have not been confirmed by experimental data. The phenomenon is being explained by micro non-uniformities in the distribution of carbon in the austenite volume (1) and G.V.Kurdyumov assumes the presence in austenite of frozen hetero-phase fluctuations. Other authors assume the formation during martensitic transformation of austenite volumes which are subjected to pressure from all sides and, therefore, have lower temperatures of martensite transformation; the influence of compression from all sides on a lowering of the martensitic transformation point has recently been experimentally proved (2). However, the latter hypothesis is not always applicable since the necessity of reducing the temperature for

Card 1/4

On the problem and nature of martensitic transformation. (Cont.)

effecting martensitic transformation is observed immediately after the formation of the first martensite acicules. All the above hypotheses are based on the invariance of the state and the properties of the austenite in the process of the martensitic transformation. The authors of this paper base their conceptions on the possibility of obtaining irreversible changes in the austenite during the martensitic transformation which increase with the development of the transformation process; the martensitic transformation may cause phase hardening of the residual austenite. These irreversible changes may cause cessation of growth of the new phase at a given temperature and its progress during further lowering of the temperature. The changes in the state of the residual austenite during the martensitic transformation was studied on cuts of 10 mm dia., 6 mm height made of high carbon manganese alloyed steels which were heated to 680 C in sealed copper ampules and after cooling in oil they were subjected for various times to cooling in vapours of liquid oxygen so that austenite-martensite structures were obtained containing various quantities of residual austenite. The studied steels contained

On the problem and nature of martensitic transformation. (Cont.)

respectively 1.21, 1.18 and 1.52% C and 2.04, 2.98 and 2.94% Mn. An increase in the martensite content from 20.4 to 39 and 50.6% respectively brings about an increase in the modal microhardness of the residual austenite from 240 to 260 and 280 kg/cm^2 respectively; for martensite contents of 78 and 89% the modal microhardness values of the residual austenite increase to 410 to 460 kg/mm^2 respectively. Increase of the phase hardening of the residual austenite during the martensite transformation leads to an increase of the stability of the residual austenite against martensitic transformation. Thus, the authors obtained experimental proof during martensite transformation that a continuous change of the state of the austenite takes place and that the resulting phase hardening and strengthening of the residual austenite leads to an increased resistance of the residual austenite to further martensitic transformation. Thus, the cause of cessation of growth and of germination of martensite crystals under isothermal conditions is the increased resistance of the austenite due to phase hardening and increased strength of the residual austenite which can be overcome only by further lowering of the temperature

On the problem and nature of martensitic transformation. (Cont.)

or by applying adequate deformation stresses. Fig.1 contains the curves of distribution of the micro-hardness fields of the residual austenite of one of the studied steels for various stages of martensitic transformation; Fig.2 shows the influence on the micro-hardness of the residual austenite of the phase hardening in the process of martensite transformation during cold treatment; Fig.3 shows the influence of the stresses on the martensitic transformation of the residual austenite in the case of applying tensile stresses. Fig.4 shows the influence of the degree of phase hardening on the resistance of the residual austenite against martensitic transformation.
4 figures and 4 Slavic references.

ASSOCIATION: All Union Correspondence Course Engineering Institute. (Vsesoyuznyy Zaochnyy Mashinostroitel'nyy Institut)

AVAILABLE:

Card 4/4

Blanter, M. Ye.

129-12-4/11

AUTHORS: Blanter, M. Ye. Doctor of Technical Sciences, Prof. and Kuznetsov, L. I., Engineer.

TITLE: Recrystallization processes in alloyed nickel alloys. (Rekristallizatsionnyye protsessy v legirovannykh splavakh nikelya).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1957, No.12, pp. 31-36 (USSR)

ABSTRACT: Systematic data on the influence of the alloying elements on the recrystallization processes in binary nickel alloys are not available, except those published by Davis, M., Densem, C.E., Rendball, J.H. (Ref.1) for Ni-W alloys. Therefore, the authors of this paper studied the influence of Mo, Cr, Ti and Co on the process of softening, "recovery", and recrystallization in binary nickel base alloys. The composition of the alloys was selected in accordance with the diagrams of state of nickel and the respective element in the range of homogeneous solid solutions, see Table 1, p.32. The Ni-Mo, Ni-Cr and Ni-Co alloys were produced in a chromium-magnesite crucible, inside a high frequency furnace, and the Ni-Ti alloys were produced in a magnesite crucible. After casting into 3.5 kg ingot,

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the material was forged into rods of 9 x 9 mm cross section and annealed at 880 to 890°C for 30 minutes. Following that, the rods were cut into specimens 6 to 7 mm high and deformed at room temperature by means of a 50 ton press with reductions of 5, 10, 25 and 38%. The recrystallization processes were studied on the basis of metallographic analyses and by the hardness method. The grain size of the alloys was characterized by the specific area of division of the grains (S mm^2/mm^3) determined by means of the method of random secants proposed by Saltykov, S.A. (Ref.2). The results of investigations of the influence of preliminary plastic deformation for the alloy M8 are reproduced in the graph, Fig.1, which shows the influence of the heating temperature on the size of the specific surface of the grain boundaries for an Mo content of 8.17%. The graph, Fig.2, shows the influence of the heating temperature on the hardness of a preliminarily work hardened alloy M8, whilst the graph, Fig.3, gives the results of investigations of the softening and the changes in the specific surface of the grain boundaries. The influence of the heating temperature on the magnitude

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of the specific surface of the grain boundaries was investigated on a series of Ni-Mo alloys, all subjected to an equal preliminary plastic deformation of 38% and the results are plotted in Fig.4, p.33; the graph, Fig.5, shows the influence of Mo on the recrystallization processes and on the softening. The results of investigations of the influence of about 5 at.% of Ti, Cr, Co and Mo on the recrystallization processes for a preliminary plastic deformation of 38% are graphed in Fig.6, p.34. Comparison of the results of investigations of the recrystallization with results relating to softening enabled clarification of the role of individual recrystallization processes and the influence of alloying elements on these processes. In M8 nickel-molybdenum alloys containing 8.17 wt.% Mo (5.19 at.%) the initial stage of softening is determined by the recovery process, the temperature range of which decreases continuously and regularly with increasing degrees of preliminary plastic deformation; softening, accompanied by recrystallization treatment, takes place within a temperature margin of 100°C and the softening is accompanied by selective

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Recrystallization processes in alloyed nickel alloys.

recrystallization within a temperature margin of 25 to 50°C. With increasing Mo content the structure of the alloy becomes continuously finer for an equal degree of plastic deformation; increase in the Mo content leads to a continuous increase of the temperature of the beginning of the recrystallization processes and also of the temperature of the beginning and end of the softening and these temperatures increase particularly sharply for Mo contents above 8 wt.%. Softening of preliminarily deformed nickel alloys is a consequence of the recovery processes, recrystallization treatment and selective recrystallization; depending on the character of the alloying, tne importance of each of these processes will differ as regards removing the work hardening. In non-alloyed nickel the softening coincides with recrystallization treatment; introduction of equal contents of Co, Cr, Ti and Mo (about 5 at.%) changes the character of this softening. Introduction of Co leads to a larger zone of recovery temperatures; the recovery phenomenon is also observed in the case of introduction of Mo. On introducing Co, Ti or Mo, the final softening takes

 place during selective recrystallization. In the case of

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equal atomic concentrations (about 5%) of the alloying elements of the 4th period of the periodic system, the initial softening temperature increases on changing over from Co to Cr and Ti.
There are 6 figures, 1 table and 2 references, one of which is Slavic.

ASSOCIATION: All-Union Correspondence Institute of Mechanical Engineering (Vsesoyuznyy Zaochnyy Mashinostroitel'nyy Institut)

AVAILABLE: Library of Congress.

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Blanter M. Ye.

AUTHORS: Bernsteyn, M. L., Candidate of Technical Sciences 32-10-16/32
Blanter, M. Ye., Professor, Doctor of Technical Sciences
Lozinskiy, M. G., Doctor of Technical Sciences

TITLE: Achievements and Tendencies in the Development of Soviet Metallography (Dostizheniya i tendentsii v razvitii sovetskoy metallografii

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol 23, Nr 10, pp 1202-1211 (USSR)

ABSTRACT: In the introduction the history of the development if micro- and macroscopic research work carried out in the world (since the end of the 19th century) and in the USSR (since the October revolution) is described. The report is divided into 3 chapters entitled:
1.) Light microscopy. As the most notable the work carried out in this field by D. N. Rozhdestvenskiy, S. I. Vavilov, V. P. Lennik, and A. A. Lebedev is described. The optical industry of the USSR is at present producing the following apparatus (which are here described as being up-to-date): microscopes "MMM-8", "MMM-6" and "MMM-S, which are remarkable, besides their very uniform illumination, also by an additional lateral illumination and are destined for

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enlargements of up to the three-fold. For the increase of the contrast effect (upon which special stress is laid here) an additional device is provided for the microscope "ИМЗ-8" consisting of: a metal mirror condenser with parabolic reflection, a ring-shaped diaphragm, and a shiftable auxiliary line. For this purpose a dark field is used. Furthermore, the use of "conical" and "polarized" light in the microscope is mentioned, but the implements necessary for this purpose are not described. As one of the "last achievements of optical technical engineering" the method of phase contrast is mentioned, which is based upon a specially constructed additional device "КФ-3" for the microscope "ИМЗ-8". Another additional device, called "ИК", makes it possible to take photographs in the microscope by means of an ordinary camera. Furthermore, the "high pressure mercury light source" is described here as well as shortwave ultraviolet rays in the microscope in connection with the change of color. The respective apparatus is not described. Further, the newly constructed microscope "ИМЗ-14" with remote control for radioactive substances and a television microscope, which radiates a picture from a microscope on to

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a screen, are mentioned. The make is not mentioned.

2.) High-Temperature Metallography. Works by I. A. Oding, and N. G. Lozinskiy of the Institute for Machine Science of the AN USSR are referred to. Research methods are divided into two groups: 1.) Methods for the investigation of the microstructure of heated metals and alloys, and 2.) methods for the investigation of the properties of metals under the influence of different temperatures. In general heating in a vacuum (in rarefied air) is dealt with, because, if these conditions prevail, the formation of crusts and films can be avoided. As a device suited for this purpose the "ИМАШ-5М" is mentioned, which makes it possible to carry out research work at temperatures of up to 1100°C at vacuum tensions of up to 60 kg/mm^2 and to measure deformations. 3.) Measuring metallography (here described as utilization metallurgy). It consists in the measuring and judging of intercrystal and other structural intermediate distances, austenite transformations, structural shifting and other structural changes occurring in alloys when they are thermally or mechanically etc. treated. The most important works in this fields are by

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S. A. Saltykov, I. L. Mirkin, A. A. Glagolev and the "very latest" are by L. S. Morozov, N. N. Sirota, S. Z. Boksteyn and M. M. Steinberg (this is an extract from the total list). There are 5 references, all of which are Slavic.

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1. Science-USSR-Progress 2. Microscopy

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BLANTER, M. Ye.

SVECHNIKOV, V.N., akademik; STARODUBOV, K.F., akademik; DYMOV, A.M., prof.; YEL'YANOV, A.A.; CHERNIKHOV, Yu.A., prof.; SHCHAPOV, N.P., prof.; BLANTER, M.Ye., prof.

Lev Samuilovich Dlugach; obituary. Zav. lab. 23 no.12:1527-1528 '57. (MIRA 11:2)

1. AN USSR (for Svechnikov, Starodubov).
(Dlugach, Lev Samuilovich, 1887-1957)

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S/123/59/000/008/028/043
A004/A002

Translation from: Referativnyy zhurnal, Mashinostroyeniye, 1959, No. 8, p. 112, # 29413

AUTHORS: Blanter, M. Ye., Kuznetsov, L. I.

TITLE: Softening, Recovery and Recrystallization of Nickel Alloys

PERIODICAL: Tr. Omskogo mashinostroit. in-ta, 1958, No. 2, pp. 91-109

TEXT: The authors investigated the effect of Cr, Mo, Ti, Co, and Al on the processes of softening, recovery and recrystallization of nickel-base alloys. Moreover, they determined the effects of temperatures in the range of from room temperature to 1,100°C and the degree of alloying on the changes in hardness of non-deformed alloys, on the softening of differently alloyed and differently deformed alloys and on the structural changes during the softening of alloys. Comparing the mechanical properties of nickel alloys possessing an optimum content of alloying elements it follows that the hardness of these alloys is in the most effective way increased by Mo, while Cr, Ti, W and Al have a lower effect. It is shown that an increase in alloying elements (for the same degree of cold hardening) causes an increase in the temperature range of softening. In

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Softening, Recovery and Recrystallization of Nickel Alloys

Ni-Mo-alloys with 12% Mo and a cold hardening of 38%, the softening temperature range amounts to 600-1,000°C, while for 8% Mo, 1% Mo and pure nickel the values are 500-675°C, 450-600° and 400-500° respectively. Investigating the structure of Ni-Mo-alloys for the whole softening temperature range it was found that the initial period of softening is not accompanied by structural modifications and that the softening observed in this temperature range is stipulated by the phenomenon of the recovery. Mo-alloying in proportion to the Mo-content promotes the refining of the plastically deformed nickel-alloys and also increases the initial temperature of softening, machining recrystallization and collective recrystallization. The alloys with an 8% Mo-content or more show a particularly abrupt increase in these characteristics. The recovery phenomenon is not observed in Cr- or Ti-alloyed alloys. The initial softening temperatures of a number of nickel-alloys with Co, Mo, Cr and Ti are in the range of 400°C for pure nickel to 600° for Ni-alloys with 4,27% Ti. There are 11 figures and 5 references.

L. Kh. Sh.

Translator's note: This is the full translation of the original Russian abstract.

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BLANTER, M. Ye.

129-4-2/12

AUTHORS: Metashop, L.A., Engineer, and Blanter, M. Ye., Doctor of Technical Sciences, Prof.

TITLE: Hardening, softening and heat resistance of alloyed austenite. (Naklep, razuprochneniye i zharoprochnost' legirovannogo austenita).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.4, pp. 7-9 (USSR).

ABSTRACT: The first aim of the described investigations was establishing a dependence between the hardening, the process of softening during heating and the characteristics of long duration and short duration strength at elevated temperatures. For this purpose the plastic deformation was studied of the complex alloyed austenitic class steel ЭИ 481 (0.38% C, 0.58% Si, 8.4% Mn, 12.67% Cr, 7.6% Ni, 1.13% Mc, 1.31% V, 0.48% Nb, 0.008% S and 0.015% P.). The preliminary hardening was effected by tensile stretching of 3.5 mm dia. specimens by 18%. For investigating the effect of softening, specimens were heated in a salt bath for 15 mins to temperatures between 450 and 800°C and it was found that for the given degree of deformation the softening began at 550°C and

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Hardening, softening and heat resistance of alloyed austenite. 129-4-2/12

hardening for improving the heat resistance of austenitic steels should be combined with suitable alloying which leads to an increase in the temperature of the softening threshold of the austenite. Therefore, the second task of the investigations was to study the influence of alloying elements on the temperature threshold of softening of Mn containing austenite (1.2% C, 12% Mn), which was additionally alloyed by various quantities of Cr, Ni, Co and Mo. The results obtained for a preliminary deformation of 18% are entered in the graph, Fig.4.
There are 4 figure and 1 Russian reference.

ASSOCIATION: All-Union Correspondence Mechanical Engineering Institute. (Vsesoyuznyy Zaochnyy Mashinostroitel'nyy Institut).

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SOV/129-58-12-6/12

AUTHORS: Blanter, M.Ye., Doctor of Technical Sciences, Professor, Kulakov, N.A., Sergeychev, I.M., Mikhin, T.A. and Faynbron, S.D., Engineers

TITLE: Hardening in Water-air Mixtures (Zakalka v vodo-vozdushnykh smesyakh)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 12, pp 29 - 34 (USSR)

ABSTRACT: The authors investigated systematically the influence of the main factors on the cooling capacity of water-air mixtures for hardening for the purpose of obtaining quantitative characteristics which can be used as a basis for a controlled technological process. Use of water-air mixtures of various compositions permits obtaining a wide range of cooling regimes, from cooling in a jet of pure air up to quenching in a water jet. For obtaining the water-air mixtures, a nozzle with a special end piece was used, the purpose of which was to widen the atomising angle. The air pressure was maintained by means of a direct-action pressure regulator. The water-flow rate between 18 and 116 litres/hour was measured with an RS-5 rotameter and the flow rate of 185 to 1 030 litres/hour was measured by means of a rotameter RS-7 with an accuracy of 1.5-2.5%.

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Special filters were fitted to prevent clogging-up of the water-supply system. Cooling curves were recorded by means of a potentiometer with visual control of the operation of the thermocouples. At first, the problem of the optimum distance of the spraying nozzle from the surface of the plate to be hardened was investigated and the obtained relations are graphed in Figure 3. Owing to great practical difficulties involved in systematic investigation of massive steel bodies, the authors used a method of thermal modelling, as proposed by A.L. Nemchinskiy (Ref 2), which is based on the principle that in the case of cooling of bodies of sufficient length, the cooling takes place as a result of heat transfer from the longitudinal surface whilst the heat transfer between adjacent volumes of approximately equal temperature is negligible. The heat-exchange conditions were simulated by means of an analogue, a sketch of which is shown in Figure 4. The cooling curves obtained under conditions of thermal modelling of water are graphed in Figure 5. In view of the fact that the objective index of the cooling capability is the magnitude of the cooling speed, the obtained cooling curves were differentiated graphically

by the method of plotting normals, described in an earlier paper of one of the authors (Ref 4). The influence of the degree of humidification of the air on the cooling speed is graphed in Figure 6; it can be seen that the cooling speed will be highest at 800 °C except for the water-flow rate of 200 litres/hour, in which case the maximum cooling speed is at 700 °C. With increasing humidification, the rate of cooling increases, as can be seen from Figure 7. The influence of the air pressure on the cooling speed is graphed in Figure 8. The influence of the thickness of the cooled steel body on the cooling speed is graphed in Figure 9. The influence of the degree of humidification on the depths of the hardened layer is graphed in Figure 10. It was established in the experiments that the cooling power of the investigated mixtures varies within a wide range and cooling in oil is equivalent to cooling in slightly humidified air with a water-flow rate of about 20 litres/hour under the same conditions. It was experimentally established that the optimum distance from the spraying nozzle to the surface to be cooled equals 500 mm, while the optimum air pressure

Hardening in Water-air Mixtures

equals 3 atm. For the particular case of hardening of massive bodies with sharp cross-section changes, the maximum permissible water-flow rate for the steel 5KhNV equals 100 litres/hour and the active cooling surface equals 0.05 - 0.20 m^2 per each atomiser nozzle of the applied design. It is shown that investigation of the pertaining relations can be extended to bodies of 400 - 700 mm thick. Thus, use of special metering apparatus permits working out of a correctly controlled method of hardening by means of water-air mixtures, ensuring standard heat-treatment results whereby control of the process can be made fully automatic. Due to the great simplicity of the equipment, the method can be recommended as a completely satisfactory and economic substitute for hardening in oils and other special media.

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There are 10 figures and 5 references, 4 of which are Soviet and 1 German.

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